

# AI AUTOMOTIVE INDUSTRIES

AUGUST 1, 1953

AUTOMOTIVE and AVIATION MANUFACTURING  
CIVILIAN AND DEFENSE  
ENGINEERING • PRODUCTION • MANAGEMENT

***In This Issue . . .*** Chrysler High Ratio Torque Converter . . . Homes on  
Wheels . . . European Aviation . . . Bendix Linkage  
Power Steering . . . Defense Contract Termination  
COMPLETTABLE OF . . . Casting Tank Hulls . . . German Diesel Tractors  
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A C H I L T O N P U B L I C A T I O N



## Stops tarnish on copper alloy jobs...

● Sciaky Brothers, Inc., Chicago manufacturers of spot welding equipment, were having trouble obtaining a suitable finish on certain copper alloy parts. After they were machined, parts frequently had to be processed to remove stain or tarnish.

Upon the advice of a Standard Oil cutting oil specialist, officials of this company put a STANICUT Cutting Oil to work on the troublesome copper alloy machining jobs. It was the end for tarnish troubles. On a wide variety of operations employing many different copper alloys, STANICUT has provided both superior finish and excellent tool life. Of further importance to this company, STANICUT is now used for all operations requiring a cutting oil. This has eliminated the cost and trouble of stocking and using several different cutting oils.

To help you get better cutting oil results, Standard Oil has a metalwork-



ing service that is unique in the Midwest. It gives you the metalworking products, the engineering service, and the supply service that fit your special operation and needs. The cutting oil specialist serving in your section of the Midwest will be glad to tell you more about this personalized service. You can reach this man easily by phoning your local Standard Oil office.

## What's YOUR problem?



A. L. Seabaugh, who makes his headquarters at Standard's Chicago office, is the cutting oil specialist who recommended STANICUT Cutting Oil to operators of this midwest company and helped them solve a tarnish problem.

A. L. Seabaugh is one of a corps of able lubrication specialists who have headquarters in Standard offices throughout the Midwest. These men have been specially trained in Standard Oil Lubrication Engineering Schools and, in addition, have a wealth of practical experience. The specialist nearest your plant will work closely with you, giving you the help you need when you need it, to produce better cutting oil results. Phone your local Standard Oil office for his services.

**STANICOOL HD Soluble Oil**—Because it contains additional compounding, this heavy-duty soluble oil possesses not only the cooling ability of an emulsion but also the ability to give better tool life and finer finishes than can be obtained with a conventional soluble oil.

**STANOSTAMP Compounds**—Here are three established products for stamping or heavy drawing operations of either low-carbon or alloy steels. Water can be added to these paste compounds to provide the most economical applications. STANOSTAMPS offer maximum protection for dies and work.

These compounds can be removed readily in conventional washing equipment.

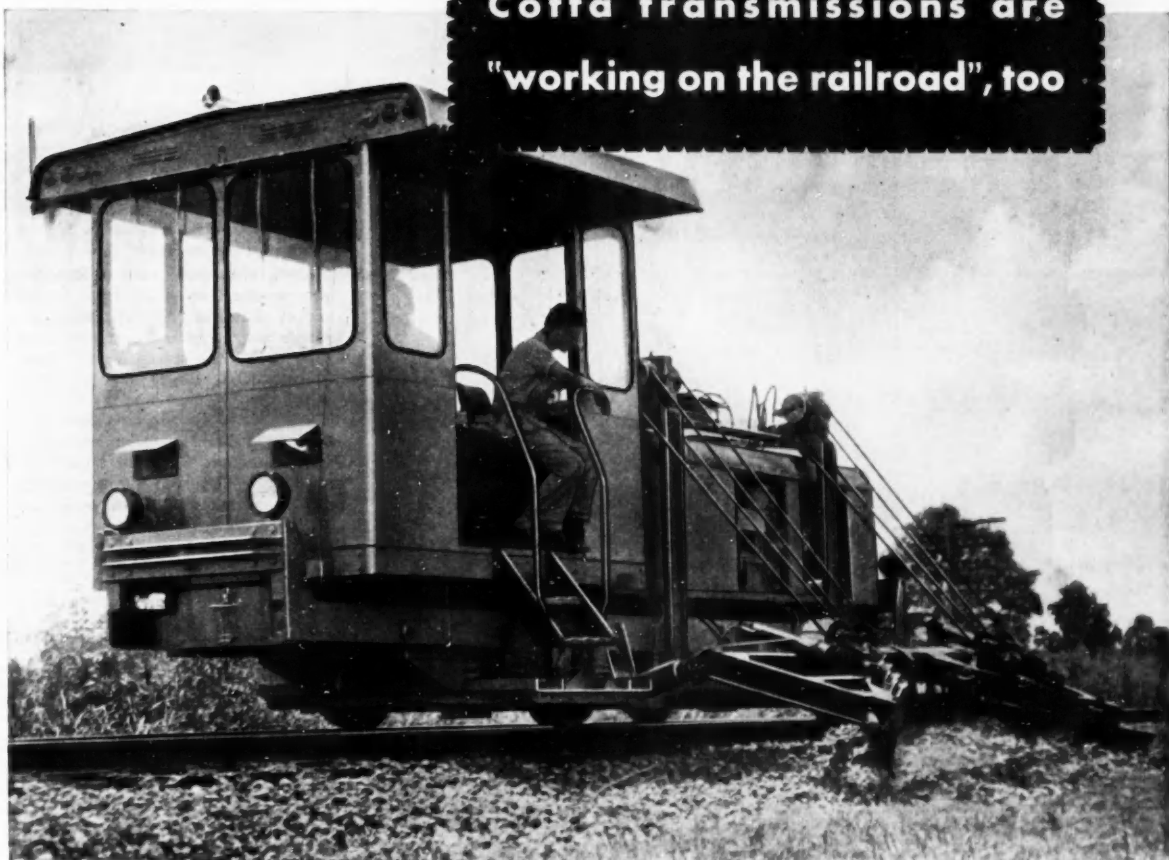
**STANDARD OIL COMPANY**



(Indiana)



**Cotta transmissions are  
"working on the railroad", too**



It's an exacting, never-ending job to maintain a smooth, safe roadbed for the "crack" streamliners. This Fairmont Ballast Maintenance Car can recondition more track in an hour than a sizeable, well-equipped section gang can do in days. Powerful, heavy-duty Cotta Transfer Cases, with two speeds forward and two reverse, provide Fairmont with smooth, silent, low-cost power transmission capable of taking the

heavy loads and shocks imposed by this kind of operation. For cranes, drillers, shovels, locomotives, generators, pumps, etc., Cotta Transmissions are designed to give rugged, heavy-duty performance and long, trouble-free service life. If you have a power transmission problem that requires this kind of reliable operation — with input torque ranging from 150 to 2000 foot pounds — come to Cotta!

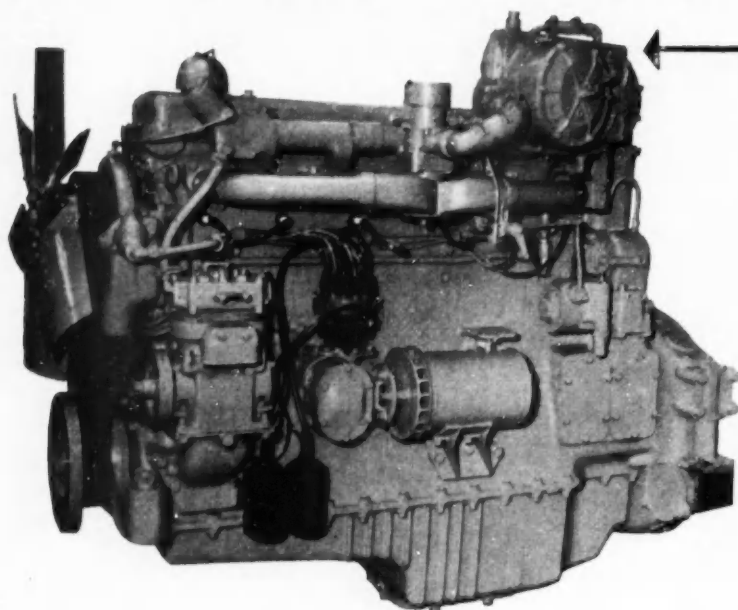
**THIS INFORMATION WILL HELP YOU**

Diagrams, capacity tables, dimensions and complete specifications sent free on request. Just state your problem—COTTA engineers will help you select the right unit for best performance. May we work with you?  
**COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS**



**COTTA**  
**HEAVY-DUTY**  
**TRANSMISSIONS**

**"Engineered-to-order"**



Hall-Scott engineers specify cylinder heads and blocks in nickel alloyed iron to increase wear-resistance, and to improve machinability regardless of section size. To solve the problem of blow-by and assure maximum mileage between overhauls, they specify pistons equipped with a top ring groove insert of Ni-Resist®, a high nickel alloy iron...which effectively resists wear, heat and corrosion. And they utilize the strength and toughness of nickel alloy steel studs in the upper crankcase passing through the block and the head to hold the entire engine rigid and cylinder bores free from distortion. Crankshaft, connecting rods, valves...in fact, practically all vital parts are of alloys containing nickel to meet various combinations of operating, service and fabrication demands.

## How a Hall-Scott Six

**DEVELOPS** { **310 BHP with Gasoline**  
**346 BHP with Butane**

**with vital parts made from nickel alloyed irons and steels**

This dual-fuel six cylinder engine now in production at the Hall-Scott Motor Division, ACF-Brill Motors Company, Berkeley 10, California, requires only slight modifications to convert it from one fuel to the other.

Designed for trucks and industrial uses, this high-powered unit weighs but 2300 pounds and exemplifies how alloys containing nickel give greater play to the skill of automotive engineers.

From among the many engineering alloys containing nickel, you can select a material to

provide the best set of properties for meeting one or a combination of requirements. The caption above indicates how Hall-Scott engineers used alloys containing nickel to obtain distinct advantages.

When you have a metal problem, send us details for our suggestions.

At the present time, nickel is available for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.



**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET  
NEW YORK 5, N.Y.

A CHILTON MAGAZINE

**AI**

PUBLISHED SEMI-MONTHLY

**AUTOMOTIVE INDUSTRIES**

AUGUST 1, 1953

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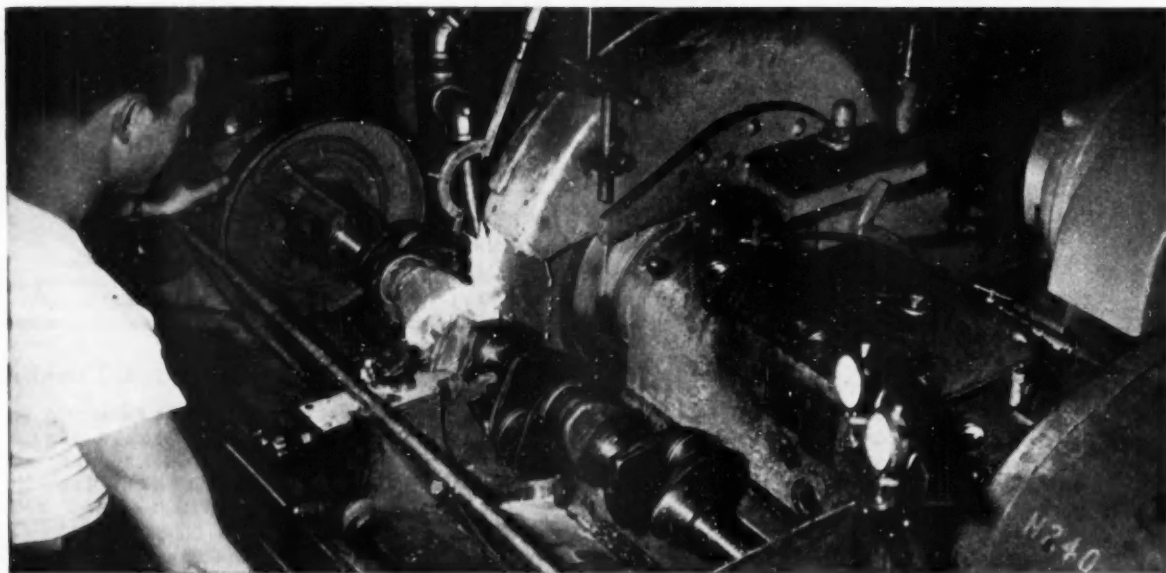
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AUTOMOTIVE INDUSTRIES, August 1, 1953

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# "TEXACO LUBRICATION ENGINEERING SERVICE IS REALLY 'ON THE BALL'"

—Norman Nesbitt, Purchasing Agent,  
Atlas Crankshaft, Inc., Fostoria, Ohio



**A**TLAS CRANKSHAFT, INC., takes pride in the fine quality of its products — and whatever helps to maintain that quality is highly prized. That is why Atlas has been using *Texaco Soluble Oil* in its grinders for a good many years — getting fine results in finish, rust prevention, emulsion stability and cleanliness.

But Atlas is particularly pleased with the service that goes with Texaco products. Mr. Norman Nesbitt, Purchasing Agent, writes:

"A Texaco Lubrication Engineer

calls on us regularly and confers with our engineers and operators. When, a couple of years ago, our water condition changed, your engineer got together with ours and recommended changing from *Texaco Soluble Oil D* to *Texaco Soluble Oil HW*, to avoid possible adverse effects from increased water hardness. We followed his advice and have continued to get fine results.

"This is the kind of foresightedness in stopping trouble before it starts that makes me say that Texaco

Lubrication Engineering Service is really 'on the ball'. We appreciate it, as I am sure your other customers do."

Skilled Texaco Lubrication Engineering Service is famous everywhere. Put it to work in your plant — along with *Texaco Cutting, Grinding and Soluble Oils* — and step up production, reduce unit costs.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



## TEXACO

## CUTTING, GRINDING AND SOLUBLE OILS

FOR FASTER MACHINING



ASK

# BAIRD

ABOUT IT!

## HIGH PRODUCTION TOOLING

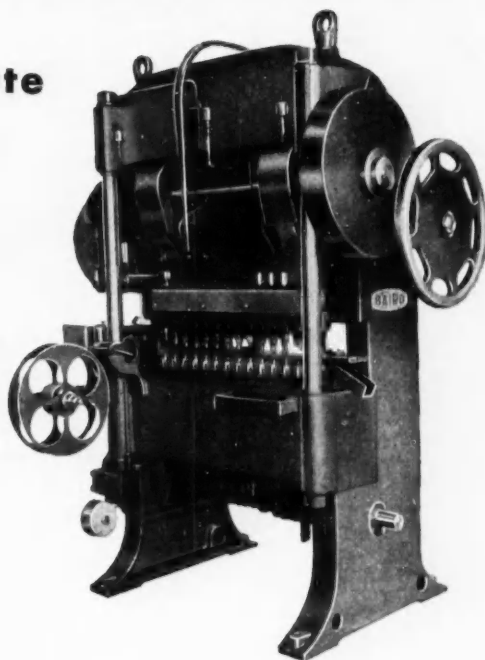
### 80 complete pieces per minute

#### FOR PROFITABLE PRODUCTION

Here is low-cost, completely automatic production . . . typical of precision stamping that can be performed on the Baird Multiple Transfer Press.

For complicated work, with punch holders and die blocks . . . transfer slides and fingers . . . progressive operations through 14 stations, might include blanking, drawing, piercing, embossing, slitting, trimming, broaching, sizing, hexing, forming, inserting, and riveting. And tooling is easily replaceable for the work required.

There are 12 press sizes, taking automatically-fed coiled stock from 2½" to 4"; maximum feed length from 2" to 3½". For low-cost, volume production within its range, there's no more profitable automatic than the Baird Transfer Press. Bulletin on request.

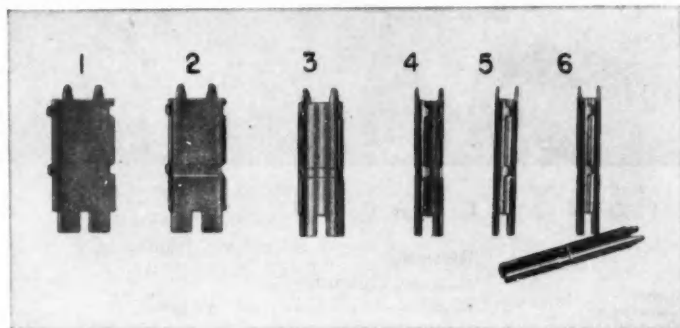


**BAIRD AUTOMATIC TRANSFER PRESS**

#### *Producing an electrical switch part*

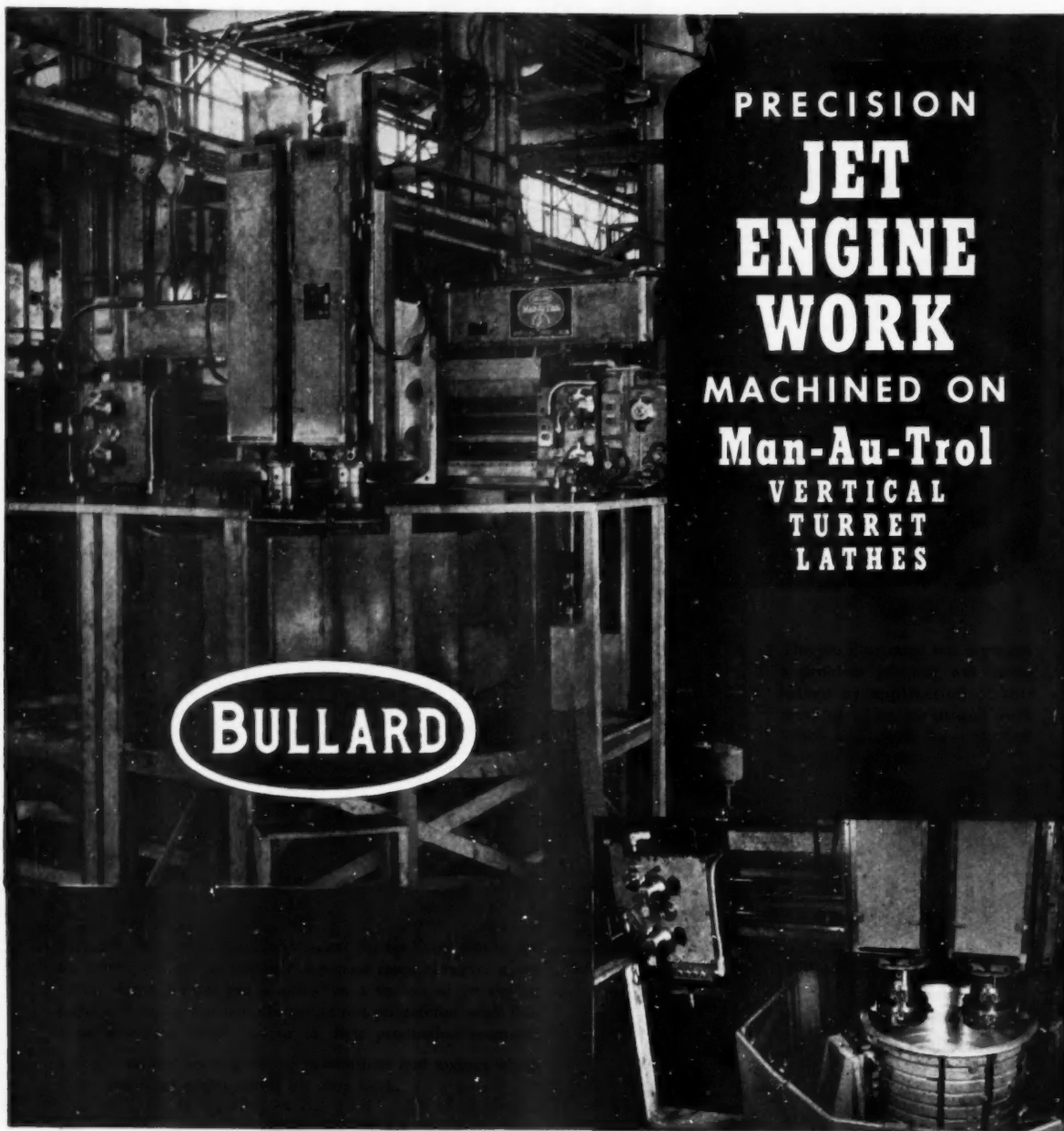
Here is a hollow shaft, used in an electrical switch, that is produced completely in a 6-station die set. At station No. 1, the part is blanked from flat stock. At No. 2, the outer edges are curled . . . and the remainder of the forming operations take place at stations No. 3, 4 and 5. Final sizing is performed at No. 6. This shaft is made in different lengths and variations, by means of interchangeable punches and dies. Production, 80 pieces per minute . . . 4800 per hour.

48A53



*the* **BAIRD MACHINE COMPANY**  
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING  
MACHINES • AUTOMATIC PRESSES • TUNNELING MACHINES



PRECISION  
**JET  
ENGINE  
WORK**  
MACHINED ON  
**Man-Au-Trol**  
VERTICAL  
TURRET  
LATHES

**BULLARD**

O P E R A T I O N   D E T A I L S

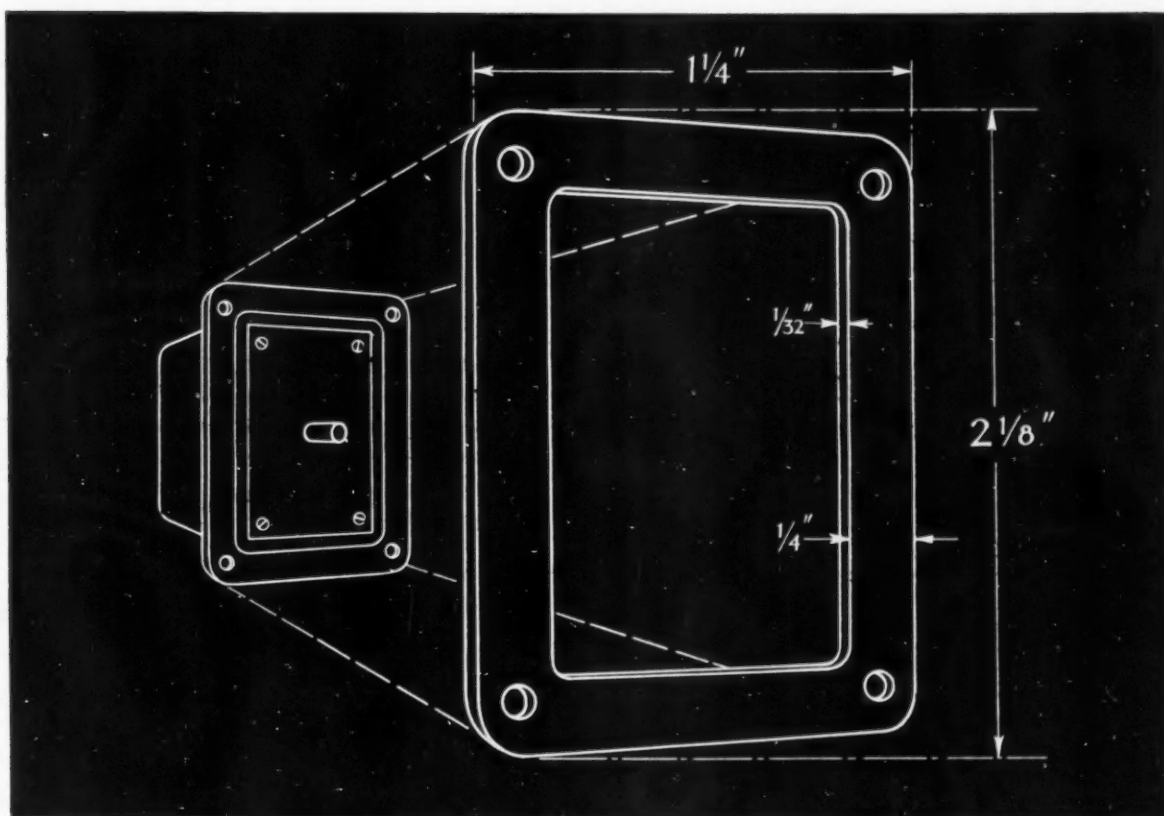
**ROUGHING**

Rough bore I.D. with right ram.  
Rough face and counterbore, turn O.D. with left ram.  
Rough 5 large grooves with right ram.  
Rough 7 small grooves with left ram.  
Underface bottom and turn O.D. with right ram.

**FINISHING**

Finish bore I.D. with left ram.  
Finish face and counterbore with right ram.  
Finish 5 grooves with right ram.  
Finish 7 grooves with left ram.  
Finish underface bottom.

*"Ask for Estimates on Your Work"*



## *Here's a fiber gasket that seals under light bolt pressure*

The stamped metal flange of this solenoid cover made sealing with conventional fiber gaskets difficult. Under light bolt pressure, which was all that could be used without distorting the flange, most fiber gaskets developed oil seepage.

The engineer in charge avoided the expense of a high-cost gasket by using an entirely different kind of fiber gasketing—Armstrong's Accopac®. This new material has the high, even compressibility needed for a positive seal under light flange pressure. Finely ground cork particles added to Accopac's fiber and latex composition give it this high compressibility and insure leak-free sealing.

**Crush resistance.** On rough, heavy cast flanges, Accopac seals equally well. It has unusual resistance to crushing, which often occurs when bolting pressures are concentrated at local high spots. Accopac withstands loads up to 100,000 psi without damage, while conventional fiber

sheets often rupture at approximately 25,000 psi. **Won't shrink, won't grow.** In use or in storage, Accopac gaskets maintain their unusual dimensional stability. Not even hot oil will cause them to shrink, dry out, or leak when used in any recommended application.

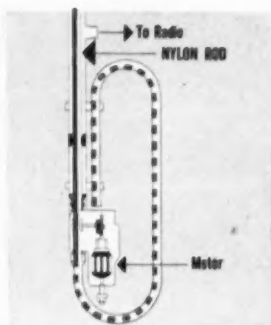
This dimensional stability helps reduce storage losses. Variations in temperature and humidity don't cause progressive or permanent changes in Accopac replacement gaskets. They'll still fit, still seal perfectly after many months in storage.

**Write for samples.** You may find Accopac helpful in replacing an unsatisfactory fiber gasket or in reducing costs on a gasket now made from a more expensive material. For samples, call your nearest Armstrong office or write us. Accopac is available in sheets, rolls, ribbons, or die-cut shapes, in either cellulose or asbestos types. Armstrong Cork Company, Industrial Div., 7008 Imperial Ave., Lancaster, Penna.

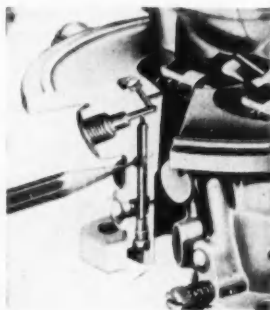


# ARMSTRONG'S ACCOPAC

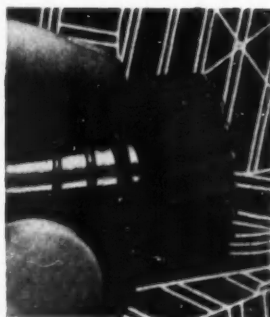
**AUTOMATIC ANTENNA** has flexible rod of Du Pont nylon that raises and lowers the "live" members. Nylon was the only material flexible enough to fold into the trombone-like position, yet rigid enough to force the antenna up and down.



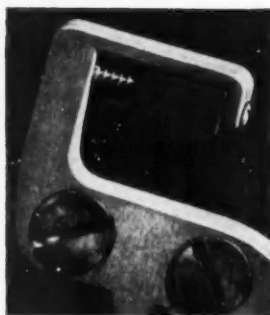
**CARBURETOR PERFORMANCE** is improved with automatic spark-control unit that has ball check valve of Du Pont nylon. Lightweight nylon reacts instantly to pressure differentials... resists electrolytic and chemical corrosion.



**PRODUCTION OPERATIONS** were cut from five to one when this speedometer take-off drive gear was molded to close tolerances of Du Pont nylon. Long-wearing nylon resists abrasion... runs quietly... lasts life of the car.



**DOOR-LOCK WEDGE** of Du Pont nylon provides superior abrasion-resistance, high resistance to repeated impact of door slamming. No maintenance required—needs no lubrication. Injection-molded production cuts costs.

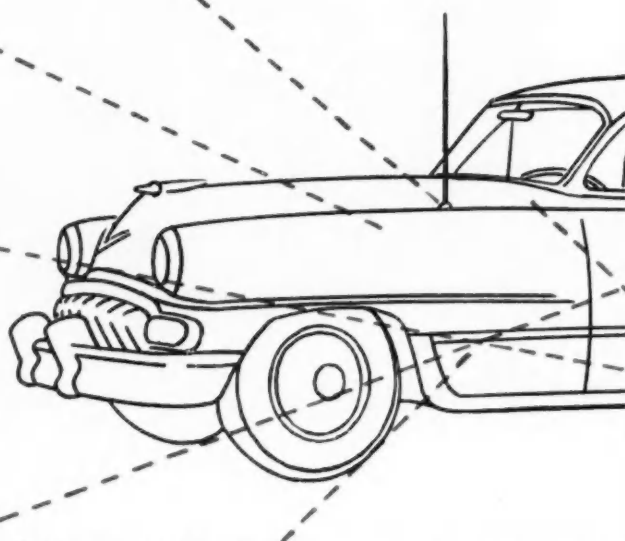


**PEDAL-TOEPLATE BUMPER SEALS** with washers of nylon enabled engineers to cut in half the space required for floorboard clutch and brake seals. Du Pont nylon withstands abrasion... seals out noise, fumes, dirt and water.



## Proven materials for For mechanical jobs... **DU PONT NYLON**

**MOLDED NYLON** provides strength in thin sections, abrasion resistance, light weight, form stability at high temperatures and a low coefficient of friction.



### What is your engineering problem?

Shown here are only a few of the many examples in which the automotive industry has put to use the outstanding properties of Du Pont nylon and "Lucite." Forward-looking engineers are finding in these materials the unique properties that make possible many of their ideas for new innovations in improved design and performance.

**Additional engineering properties** are available in two other Du Pont plastic materials: "Teflon" tetrafluoroethylene resin, the heavy-duty material with outstanding heat resistance, chemical inertness and mechanical strength. And "Alathon" polyethylene resin with its excellent dielectric properties, flexibility and toughness, moisture resistance and light weight.

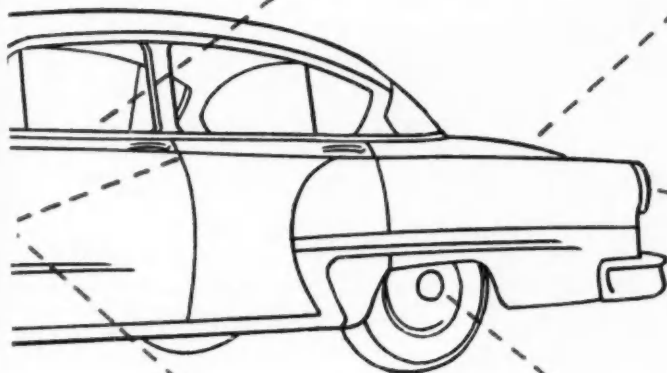


**automotive engineering**

**For styling jobs...**

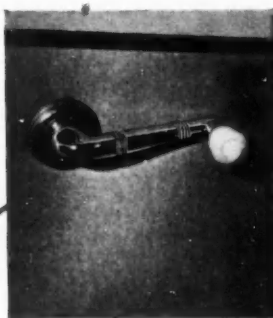
# DU PONT "LUCITE"

**BEAUTIFUL "LUCITE"**\* acrylic resin offers optical clarity, outdoor durability, shatter resistance, strength, and unique "edge-lighting" properties.

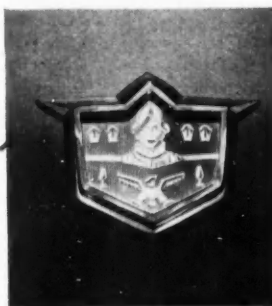


Perhaps the wide variety of properties offered by these proven materials can help blueprint your ideas for the future. For full information, write: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 178L, Du Pont Bldg., Wilmington 98, Delaware.

\*REG. U. S. PAT. OFF.



**WINDOW-CRANK KNOBS** of "Lucite" have luxurious smoothness . . . warm look and feel that is characteristic of this acrylic plastic. They withstand impact . . . can be molded in various colors to complement decorative schemes.



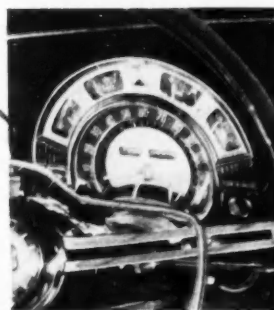
**HOOD AND TRUNK MEDALLIONS** show the beautiful three-dimensional color effects that can be obtained with durable "Lucite." In normal use, Du Pont "Lucite" is unaffected by gasoline, lubricants and other solvents.



**TAIL-LAMP LENSES** of "Lucite" combine eye-catching beauty with outstanding optical properties. "Lucite" may be molded in intricate shapes. It is strong and shatter-resistant . . . has good dimensional and color stability.

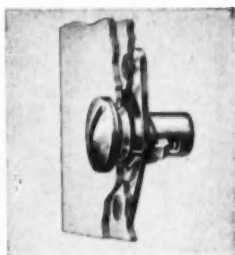
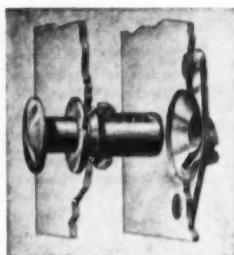


**HUB-CAP EMBLEMS** inset with gleaming "Lucite" add a touch of distinctive styling that customers appreciate. Durable "Lucite" insures lasting beauty despite close-to-the-road service and constant exposure.

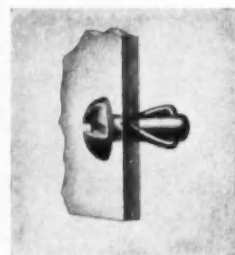
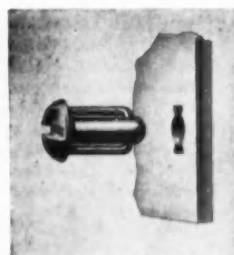


**INSTRUMENT PANEL FACES** are easy to read when made of sparkling "Lucite." Du Pont "Lucite" has excellent light-transmission characteristics . . . can be used to "edge-light" and "pipe" light around curves for greater lighting efficiency.

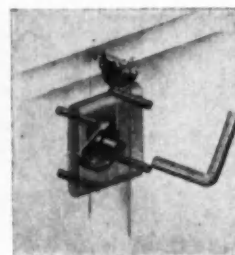
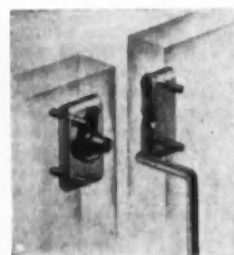
# 3 ways to save on assembly costs



**QUICK-LOCK** For fastening removable access doors and panels. Because of its ease of installation, QUICK-LOCK is ideal for assembling removable panels. A 90° turn locks it in place. Stud is self-ejecting when unlocked; visual inspection shows whether fastener is locked. Spring loading takes initial load; solid supports carry increased load. Available in a wide range of sizes.



**SPRING-LOCK** One-piece fastener for blind holes has load-carrying steel spring wire. Spring steel arms lock fastener securely, prevent loosening under vibration. SPRING-LOCK will work with varying panel thicknesses, locks with a twist of the wrist. SPRING-LOCK is now available in high-impact plastic. The molded design permits heads to be made in various shapes for refrigerator shelf supports, washer knobs, brackets. Available in a wide variety of shapes and sizes, and also in custom designs.



**ROTO-LOCK** Serrated, tapered cam is engaged by formed lug as fastener is locked. Cam action draws panels together tightly, insures locking even under conditions of misalignment. Opens easily for demounting. ROTO-LOCK carries heavy tension and shear loads; can be used for air and water-tight seals; recesses completely into panels. Solidly built without springs or delicate mechanical parts, unaffected by arctic temperatures or field service.

## Simmons


QUICK-LOCK  
SPRING-LOCK  
ROTO-LOCK  
LINK-LOCK  
DUAL-LOCK

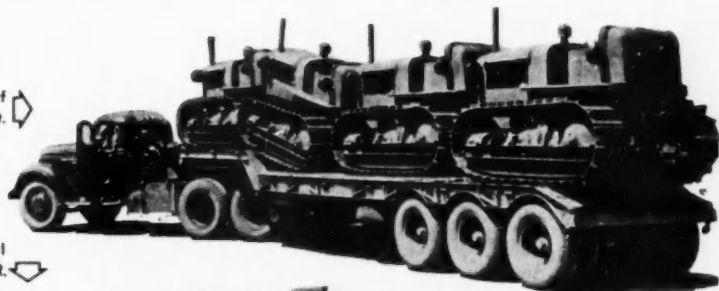
JUST OUT!  
NEW 36-PAGE CATALOG WITH APPLICATIONS  
SEND FOR IT!


Simmons Fasteners are widely used in refrigerators, washing machines, electrical equipment, electronic assemblies, prefabricated portable shelters, coolers, demountable furniture. Every Simmons Fastener is a service-proved design with a long record of assembly-cost saving in many industries.

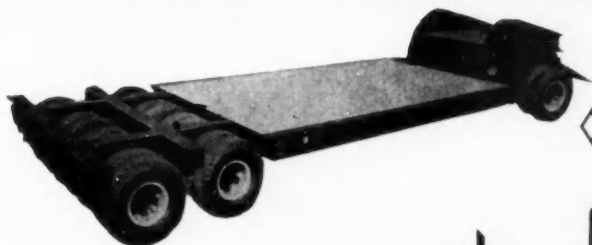
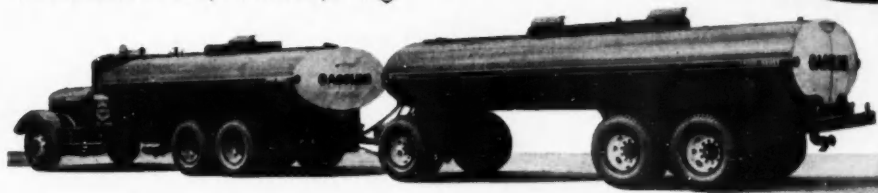
If you are interested in cutting your costs, turn to Simmons Fasteners—the fasteners with *uses unlimited*. Write for samples and catalogs today.


**SIMMONS FASTENER CORPORATION**  
1749 NORTH BROADWAY, ALBANY 1, NEW YORK


This low-bed trailer has an axle capacity of 66,000 lb. Mayari R reduced its weight 12.5 pct. 

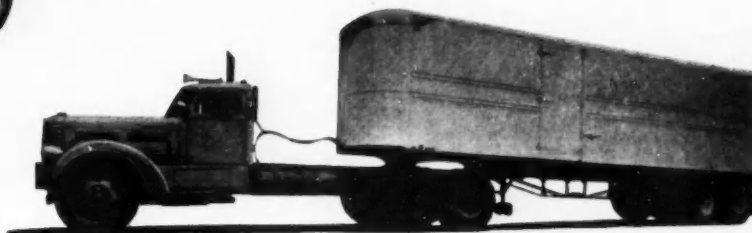


Deadweight was reduced 22 pct in this 6000-gal truck-and-trailer tank unit by the use of Mayari R. 



Mayari R helped to reduce the deadweight of this 50-ton-capacity gooseneck trailer by 35 pct. 

Built of Mayari R, this frozen-food trailer weighs 19.9 pct less than a similar unit built of carbon steel. 



## WHAT IS IT WORTH TO ADD 20% TO PAYLOAD CAPACITY?

**H**ow much do you think it would add to the value of a truck, trailer, or tanker to decrease its deadweight by 20 pct, and increase its carrying capacity by an equal amount?

This can be done readily, without exceeding the legal axle-load limits. And it can be done economically, by designing a vehicle to be built of Mayari R low-alloy, high-strength steel.

Yes, Mayari R does cost more than carbon steel—but it takes less of it to do the job. It can be used in thinner sections because it has a yield point almost double that of plain carbon steel, and it has from 5 to 6 times as much resistance

to atmospheric corrosion. It retains paint 20 pct to 80 pct longer, depending upon the type used. Also, it can be fabricated and welded by the same methods and with the same equipment that are ordinarily used for carbon steel.

If you would like more information on the properties and advantages of this superior grade of steel, write or phone for Mayari R Catalog 259.

**BETHLEHEM STEEL COMPANY**  
BETHLEHEM, PA.

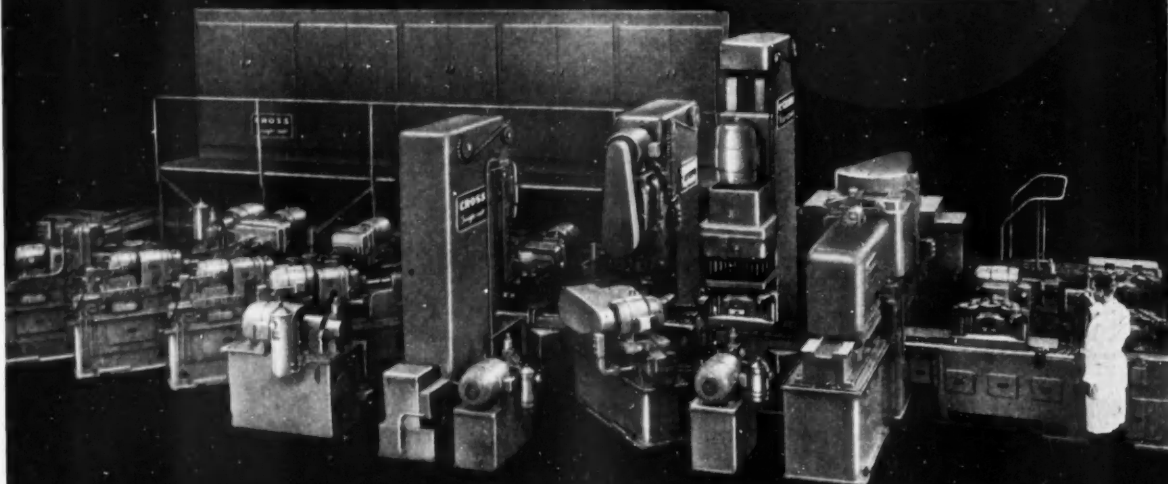
On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation. Export  
Distributor: Bethlehem Steel Export Corporation



**Mayari R** *makes it lighter... stronger... longer lasting*

*Another Transfer-matic by Cross*

## Completely Machines Exhaust Manifolds



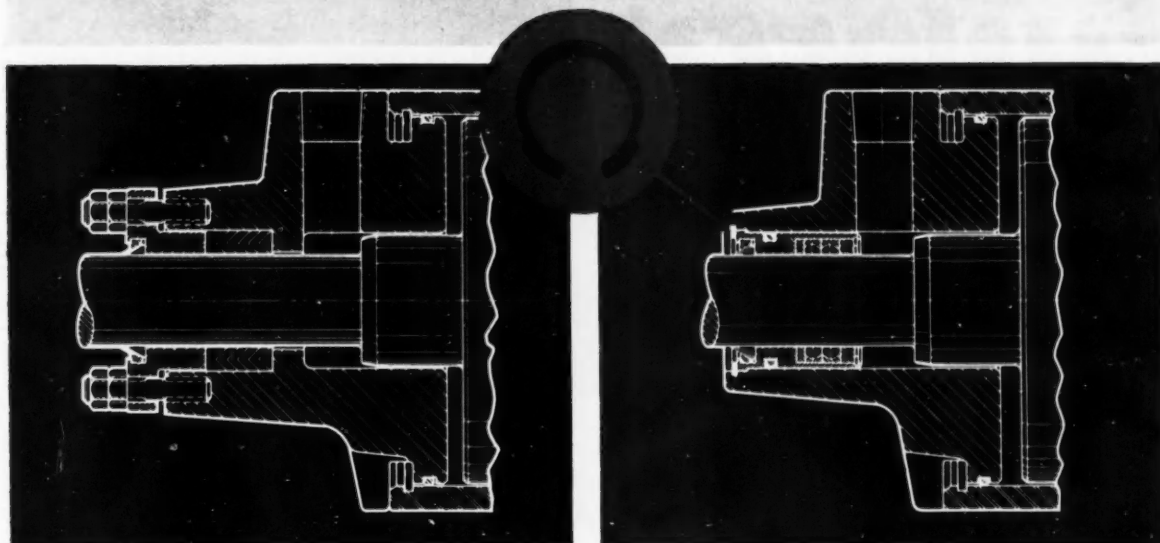
- ★ Machines right and left exhaust manifolds completely — 42 milling, drilling, boring, chamfering, and tapping operations.
- ★ 230 pieces (115 right and 115 left) per hour at 100% efficiency.
- ★ Ten stations—one loading, one unloading, three milling, three drilling, one boring, one tapping.
- ★ Palletized work holding fixtures with power wrenches for automatic operation.
- ★ Cross-Drive for milling cutters.
- ★ Other features: Built-in chip conveyor and automatic removal of chips from fixtures after each cycle, pre-set tools, J.I.C. standard construction, automatic lubrication, hardened and ground ways.

Established 1898

THE **CROSS** CO.  
DETROIT 7, MICHIGAN  
*Special* MACHINE TOOLS



# Waldes Truarc Ring Saves \$2.84 Per Unit, Cuts Labor-Time and Materials in Hydraulic Packing Unit



**OLD STYLE** stuffing box required skilled worker to install packing rings one at a time, then adjust packing glands by trial and error. Disassembly was equally difficult, time-consuming and costly.

**NEW** Monopak Cartridge is smaller, lighter, streamlined and installed with one Truarc Retaining Ring. Disassembly and reassembly with new cartridge takes unskilled worker just 1 minute.

Hydraulic Accessories Company of Van Dyke, Michigan, uses a single Waldes Truarc Inverted Ring (internal series 5008) to hold Monopak Cartridge in cylinder head.

New design eliminates costly machining and saves 2½ lbs. of material. Re-design with Waldes Truarc Retaining Ring reduces stuffing box diameter from 3½" to 2⅞", and reduces length from 5⅞" to 4⅞". Allows savings in assembly, adjusting and testing.

## NEW DESIGN USING WALDES TRUARC RING PERMITTED THESE SAVINGS PER UNIT

### MACHINE TIME SAVED:

Chuckling, facing and boring . . .	\$ .72
Drilling and tapping 3 holes . . .	.18
Drilling and counterboring 3 holes . . .	.12
Assembling, adjusting, testing . . .	.90

### MATERIAL SAVED:

1½ lbs. cast iron . . .	.30
½ lb. bronze . . .	.23
3 studs . . .	.36
3 nuts . . .	.03

**TOTAL \$2.84**

Waldes Truarc Retaining Rings are precision-engineered . . . quick and easy to assemble and disassemble. Always circular to give a never-failing grip. They can be used over and over again. There's a Waldes Truarc Ring to answer every fastening problem.

Find out what Waldes Truarc Retaining Rings can do for you. Send your blueprints to Waldes Truarc engineers for individual attention, without obligation.

For precision internal grooving and undercutting . . . Waldes Truarc Grooving Tool.



SEND FOR NEW CATALOG ➔

# WALDES TRUARC

REG. U. S. PAT. OFF.

## RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS AND PLIERS ARE PROTECTED BY ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 2,302,947; 2,302,949; 2,410,052; 2,420,921; 2,428,341; 2,430,705; 2,441,840; 2,455,165; 2,462,380; 2,462,383; 2,467,802; 2,467,803; 2,491,304; 2,509,081 AND OTHER PATENTS PENDING



Waldes Kohinoor, Inc., 47-16 Austel Place, L. I. C. 1, N. Y.

Please send me the new Waldes Truarc Retaining Ring catalog.

(Please print)

AY-085

Name \_\_\_\_\_

Title \_\_\_\_\_

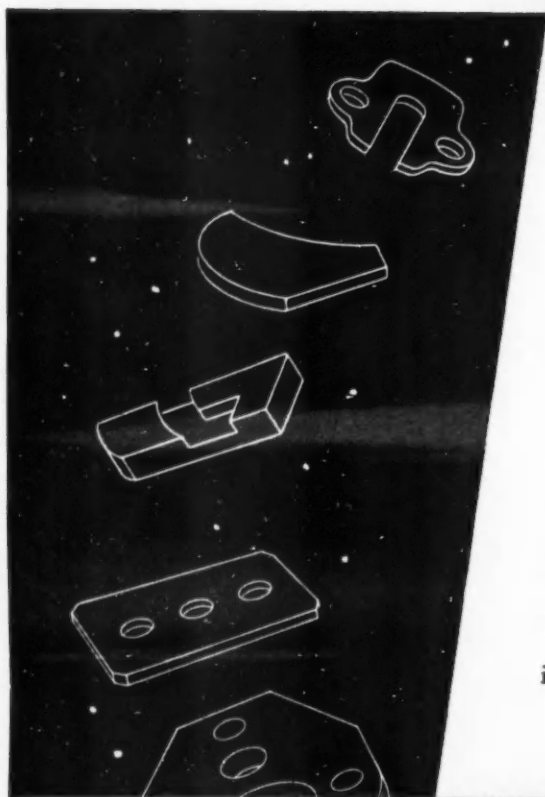
Company \_\_\_\_\_

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# western *Felt* UNSEEN of better



*Sheet and roll felt manufactured for special purposes and to meet all S.A.E. and military specifications.*

Countless products have been improved by the use of WESTERN FELT.

There is no substitute for its quality.

Its efficiency in absorbing vibration, cushioning loads, providing oil-tight seals, keeping parts dust free, evening temperatures, filtering, lubricating, etc., is the highest obtainable.

Investigate Western Felt. Engineers expert in felt uses will gladly work with you to improve your product or industrial operation.

**WESTERN**

*Felt*



**WORKS**

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MANUFACTURERS AND CUTTERS OF WOOL FELTS

# Faster... For testing...

## COMPACT, PORTABLE BENCH-TYPE TESTING UNIT FOR RAPID HIGH and LOW TEMPERATURES

Primarily developed for a branch of the armed forces, this high and low temperature testing unit has a temperature range from -80° F. to +185° F. Rapid temperature pull-down to -80° F. requires 30 minutes or less. Heat application is accomplished through reverse cycle refrigeration. Hazards of open heating elements are eliminated. Test chamber dimensions are 12" x 12" x 12" and the overall dimensions are 50" long, 26" high and 20" deep. Approximate weight is 450 pounds. The unit is compact and is entirely self contained. Controls are simplified and easy to operate. Equipped

with air-cooled compressors, the unit is quiet in operation. Cabinet is of stainless steel with all controls visible. A blower is provided for even distribution of temperatures and greater testing accuracy. The door illustrated is a latch type door providing for complete removal from the cabinet. Holes may be drilled for electrical contacts.

This is one of the many examples of WEBBER engineering skill and another of the many firsts built by WEBBER in the low temperature field.

*Write for more complete information:*

INDUSTRIAL FREEZER DIVISION  
WEBBER MANUFACTURING COMPANY, INC., 2742 MADISON AVENUE, INDIANAPOLIS 3, INDIANA  
(Formerly Webber Appliance Co., Inc.)

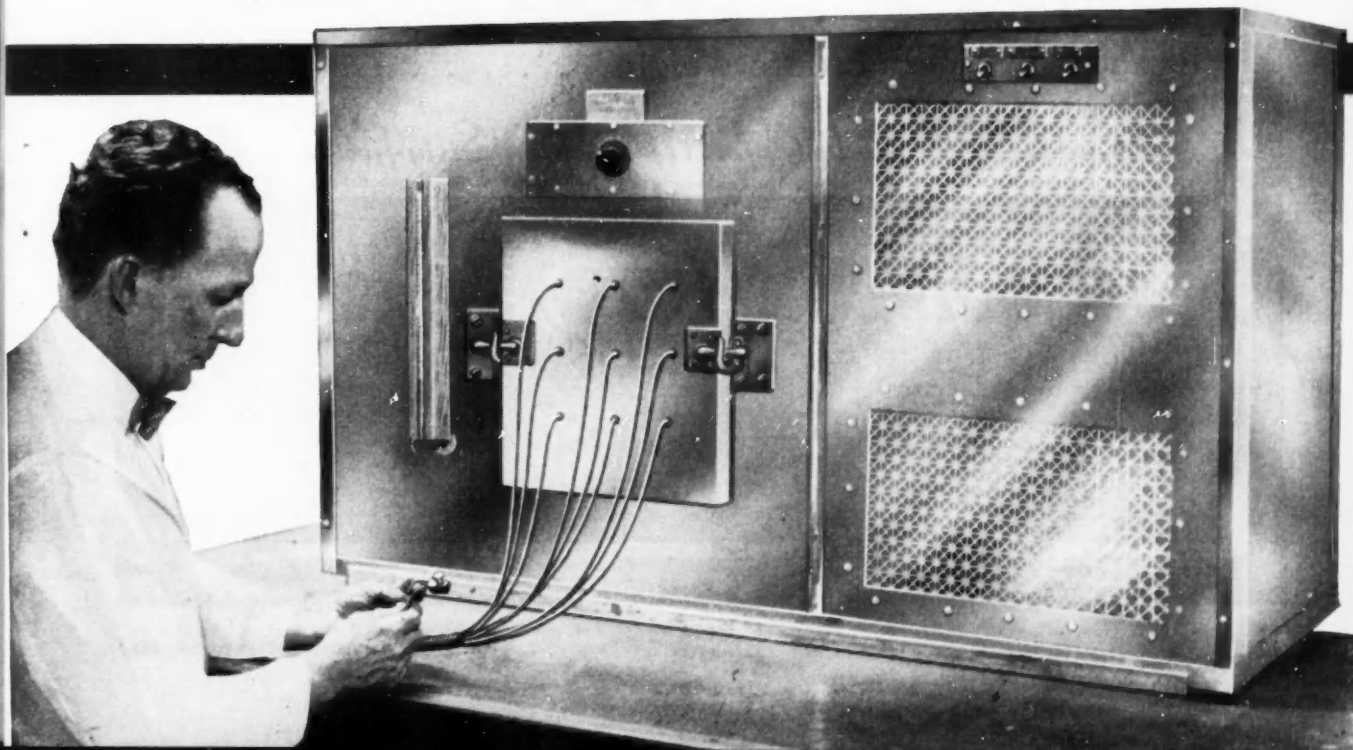
# WEBBER

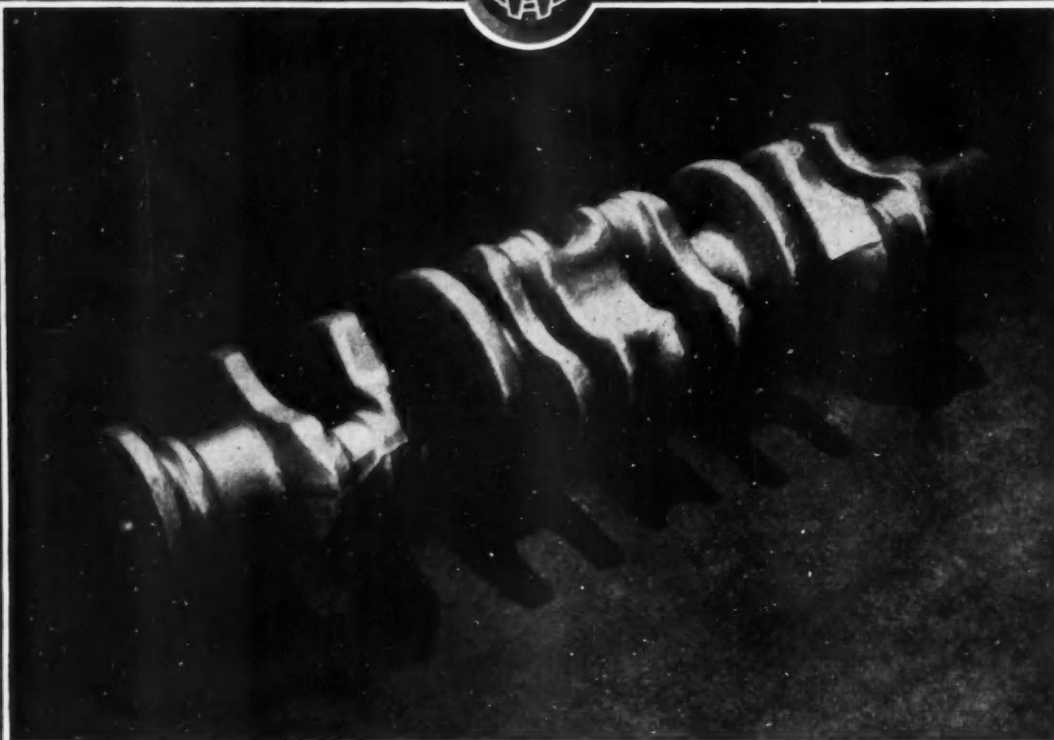
TRADE MARK

THERE'S A WEBBER UNIT FOR EVERY NEED

COMPLETE TEMPERATURE RANGE  
TESTING UNITS

LOW-TEMPERATURE  
INDUSTRIAL FREEZERS





Fully counterbalanced crankshaft—the ultimate in modern forging technique . . . Wyman-Gordon . . . crankshaft forging specialists since the introduction of the internal combustion engine . . . first to forge crankshafts with integrally forged counterweights . . . . .

*Standard of the Industry for More Than Sixty-five Years*

**WYMAN-GORDON**

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS

DETROIT, MICHIGAN



# South Wind pre-heating systems assure fast starts for any gas or diesel engine... even at 65° below!



Model 978 MF  
20,000 BTU/hr.  
fresh air output  
Total output, 30,000 BTU/hr.

**powerful! compact! economical!**  
**heater provides engine starting—**  
**cab heating—defrosting!**

Now! South Wind Pre-Heating Systems bring to any gas or diesel engine the same quick, reliable engine starting that major aircraft and military vehicles enjoy! Marking an entirely new era in pre-heating, South Wind Heaters make starting easier at all temperatures—even 65° below! Lower maintenance costs—prolong engine life!

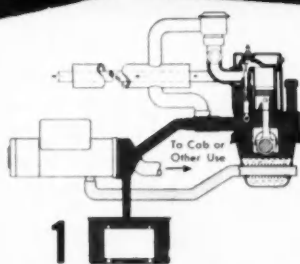
Never before such power—such compactness—such efficiency! These heaters provide *engine starting—cab heating—defrosting!* South Wind Pre-Heating Systems reduce battery drain by reducing starting torque—cut

the cost of starting aids. Eliminate the shock loads imposed by brute-force starting methods, too.

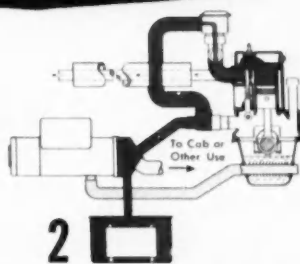
South Wind Pre-Heating Systems deliver clean, dry air to engines. Permit use of optimum viscosity lubricants. Assure normal lubrication at all times. Remove moisture—inhibit sludge formation and freeze-up of engine accessories.

South Wind Heaters include units of 20,000, 30,000, 50,000, 60,000, 100,000, 200,000, 600,000, and 700,000 BTU/hr. capacities. There is a model to meet every internal or external pre-heating requirement. South Wind field engineers are ready to consult with you on any specific problems you may have. Write today to South Wind Division, Stewart-Warner Corporation, Indianapolis 7, Indiana.

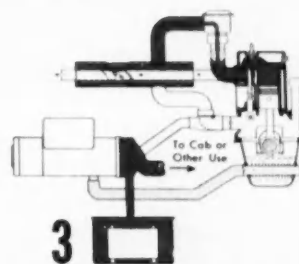
## South Wind 3-phase internal pre-heating



**1**  
**Pre-Heat Phase**—Clean, dry, hot air is used to pre-heat critical engine moving parts directly and to remove damaging moisture from engine interior—before engine cranking is attempted. (Note: Heat duct to cab for defrosting and cab heating is closed until after engine is started.)



**2**  
**Starting Phase**—Heat into engine crankcase is diverted (as shown) to air induction system to elevate temperature of fuel-air mixture and promote rapid, normal combustion in chambers. Internal pre-heating of critical parts and normal lubrication frees bearings, shafts, pins and pistons from starting strain and friction wear.



**3**  
**Operational Phase**—After easy starting, normal engine operating conditions are sustained. Now, South Wind's clean heat can be used to heat the cab, defrost windshield and supply engine induction air heat. (Note: illustration shows how normal engine induction air temperature can be sustained by engine exhaust heat exchanger.)



Model 1030  
30,000 BTU/hr.  
fresh air output  
Total output, 50,000 BTU/hr.

Model 1060  
60,000 BTU/hr.  
fresh air output  
Total output, 90,000 BTU/hr.



## South Wind

**PERSONNEL HEATING**  
**ENGINE AND EQUIPMENT PRE-HEATING**  
**WINDSHIELD DEFROSTING**



STOP  
YOUR CONTACT TROUBLES  
BEFORE THEY START



*Spectrograph equipment in the Mallory Contact Engineering Laboratory for analyzing the composition of metals and alloys used in electrical contacts.*

## To A Concentration of .0001%

Mallory quality control includes spectrographic analysis of contact metals and alloys.

At Mallory, performance and long life for the contacts in your products start in the laboratory where a spectrograph and densitometer give fast accurate answers to the composition of metals and alloys.

This equipment is used regularly in production quality control as well as in new material development and trouble shooting. It is a positive means of identifying any contamination or impurity that might reduce contact efficiency.

Mallory is equipped with complete laboratory, engineering and production facilities to handle any contact requirement—from simple button or rivet contacts to complex contact assemblies.

Mallory engineers have had years of experience in the design and production of over 5000 different types of contacts and contact assemblies. We are ready for your call.

*Expect more . . . Get more from* **MALLORY**

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 110 Industry Street, Toronto 15, Ontario

**Electrical Contacts and Contact Assemblies**

P. R. MALLORY & CO. Inc.  
**MALLORY**

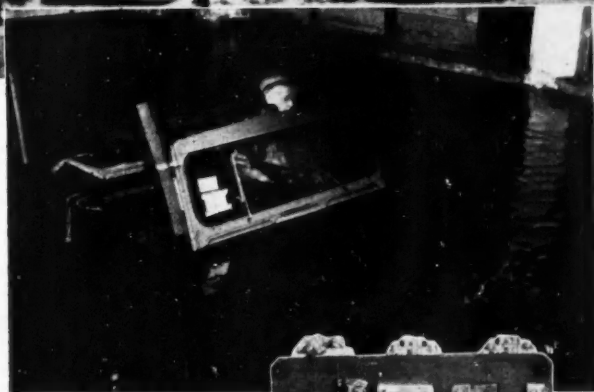
**SERVING INDUSTRY WITH THESE PRODUCTS:**

Electromechanical—Resistors • Switches • Television Tuners • Vibrators  
Electrochemical—Capacitors • Rectifiers • Mercury Batteries  
Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

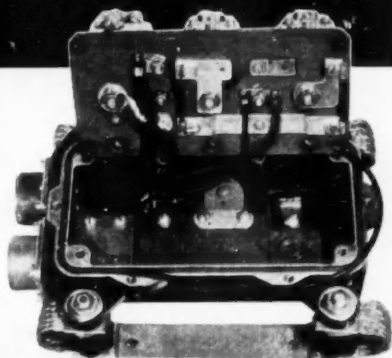
P. R. MALLORY & CO. INC., INDIANAPOLIS 6, INDIANA



Martin B-61 Matador pilotless bomber taking off. Made by the Glenn L. Martin Company, Baltimore, Md.



Jeep almost completely submerged. Can be operated in this position at about 9 miles per hour. Made by Willys-Overland Motors, Inc., Toledo, Ohio, for the Armed Forces.



Generator regulator for the 24-volt system of the submersible Jeep. This is completely waterproof and highly resistant to corrosion and fungi. Produced by The Electric Auto-Lite Company, Toledo, Ohio.



Illustrated are two of the many types of capacitors and filters made by Aerovox Corporation, New Bedford, Mass.; an important capacitor supplier to both Electric Auto-Lite and Glenn L. Martin. The unit above is the filter capacitor used in the generator regulator of the submersible jeep while the unit at the right is used in the pilotless bomber.



## In the Air— On Land— Under Water—

### WHERE REQUIREMENTS ARE SEVERE, CALL REVERE

The dramatic pictures on this page show two important special applications of Aerovox capacitors. One is the Martin B-61 Matador pilotless bomber. It contains an Aerovox capacitor, which has to withstand the terrific acceleration and speed of the craft. The other is the submersible Jeep. Its 24-volt electrical system is completely waterproofed, and includes Aerovox filters and capacitors for suppression of radio interference. Revere not only supplied copper and brass strip for the capacitor cases, but collaborated closely in setting up specifications, and in addition worked on a welding problem. In regard to the latter, an Aerovox Project Engineer wrote: "We have had much better welds." . . . Revere is always glad to collaborate on problems concerning copper and its alloys, aluminum alloys, and electric welded steel tube. Call the nearest Revere Sales Office.

## REVERE

### COPPER AND BRASS INCORPORATED

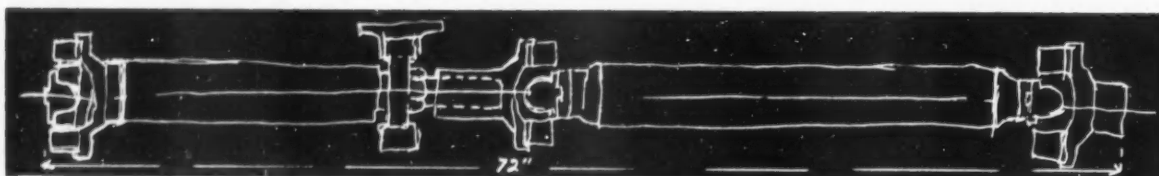
Founded by Paul Revere in 1801  
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

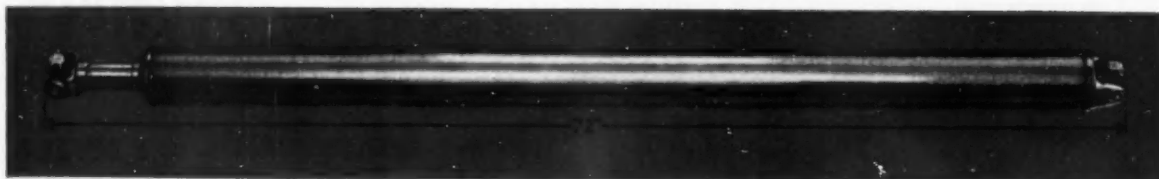
# You CAN Maintain BALANCE in a LONG Truck Propeller SHAFT

If there is a reason why your truck should not have a *mid-ship bearing*, to support an extra long drive line, like this —



You can eliminate the mid-ship bearing — and one universal joint — by using **MECHANICS Roller Bearing UNI-**

**VERSAL JOINTS** and a specially balanced, *extra long PROPELLER SHAFT* like this —



**MECHANICS** engineers constantly are solving joint and propeller shaft problems. Let them contribute their extensive experience toward making your truck or heavy duty equipment drive lines more effective.

**MECHANICS UNIVERSAL JOINT DIVISION**  
Borg-Warner • 2024 Harrison Avenue, Rockford, Illinois

# MECHANICS

*Roller Bearing*

# UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery •  
Aircraft • Tanks • Buses and Industrial Equipment

**STAYNEW INTAKE FILTERS GIVE**

**GREATER** EFFICIENCY

*plus*

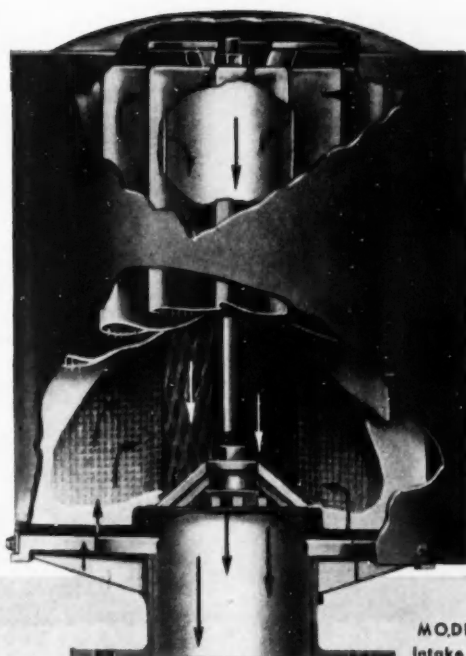
**POSITIVE** PROTECTION

**IT'S A FACT!** A filter which is 99.9% efficient is 9 times as effective as one that is 99.0% efficient. Why?—because the filter that is 99.9% efficient lets only *one-ninth* as much dirt into the engine. And, it's the dirt that *gets in* that causes the trouble.

The extreme efficiency of Staynew Intake Filters provides *positive protection*—keeps shutdowns and repairs at an absolute minimum. Efficiency actually increases with use. Staynew Intake Filters are efficient over a wide range of loads and are not affected by temperature changes. And, Staynew Intake Filters effectively protect vital engine parts without carefully held maintenance schedules . . . frequently operating two or more years without attention.

Get all the facts. Write today for Bulletin S.I.F.

Representatives in Principal Cities



MODEL D  
Intake Filter

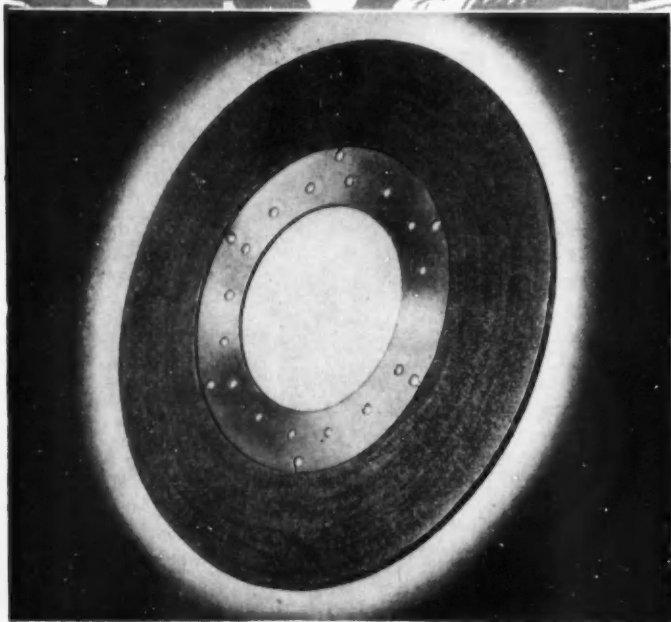


**DOLLINGER**

CORPORATION

85 Centre Park, Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED



In this crawler tractor, shifting is virtually eliminated by the hydraulic torque converter drive . . . and in this drive, a clutch plate assembly by Raybestos-Manhattan provides a vital link. Two 17" diameter R/M Vee-Lok® woven asbestos clutch facings bonded to a steel core provide smooth power flow through the entire range of operation . . . and with great durability. These facings help the tractor operate dependably under the toughest operating conditions, with drawbar pulls up to 65,000 pounds.



# THE TRADE-MARK THAT SPELLS PROGRESS IN FRICTION MATERIAL DEVELOPMENT!

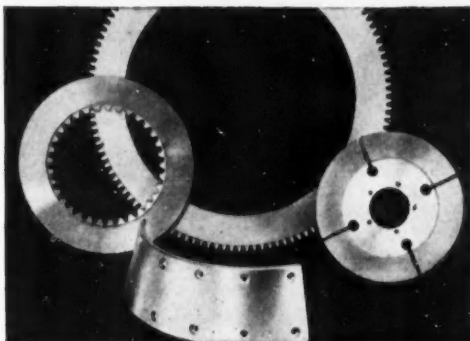
Advances in the field of friction materials for earth-moving equipment are but one phase of the continuing progress being made at Raybestos-Manhattan laboratories!

Similar advances in other fields are taking place all the time, through cooperation of design engineers and R/M research. This is true of the construction equipment industry, the mining machinery industry, the automotive industry, the office equipment industry, and many others.

To serve these many industries, R/M uses countless combinations of different types of friction material . . . including woven and molded asbestos, semimetallic materials, and sintered metal parts. Several of the newest developments in this important field stem from R/M's continuing research in powder metallurgy.

Whatever your friction material problem, your R/M representative is ready to help. He can work from samples, from designs on

paper, from figures on horsepower developed combined with desired performance characteristics. Behind him stand all the facilities of the world's largest maker of friction materials . . . with six great plants, their research departments, and their testing laboratories.



*Sintered metal parts* are being used more and more in applications that require close tolerances, plus exceptional adaptability to working conditions such as operation in oil. Production capacity for R/M sintered metal parts is now greater than ever.

*Write for Engineering Bulletin illustrating examples of R/M friction materials, for the aviation, agricultural and automotive industries . . . among others*

## RAYBESTOS-MANHATTAN, INC.

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RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings  
Fan Belts • Radiator Hose • Industrial Rubber Products • Rubber Covered Equipment • Packings • Teflon  
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AUTOMOTIVE INDUSTRIES, August 1, 1953





Logging in Oregon's Cascade Mountains

means  
**EXTRA SAFETY**  
 on any  
 hauling job!

**Mighty Bendix-Westinghouse Air Brakes Provide  
 Perfect Control on Toughest Logging Hauls!**

Take a 275-horsepower, 15-ton logging tractor and trailer rig . . . pile on more than 70 tons of giant timbers . . . add mile after mile of treacherous 20% mountain grades and you've got a good picture of a job where only the **very best brakes** are good enough. And in the logging industry that means only one thing—Bendix-Westinghouse Air Brakes! That's because these mighty brakes, built by the industry's most experienced manufacturer, pay off with the **extra stopping power and performance** that assure the safest, surest, most dependable braking action and longest service life in the business. And these are factors that help **cut costs, step up efficiency** on any hauling job—from the roughest to the most routine. That's why, no matter what type trucks or buses you build, you can **give your customers the utmost in safety, dependability and savings** by specifying Bendix-Westinghouse—the world's most tried and trusted air brakes.

***Bendix-Westinghouse***

THE WORLD'S MOST TRIED AND TRUSTED

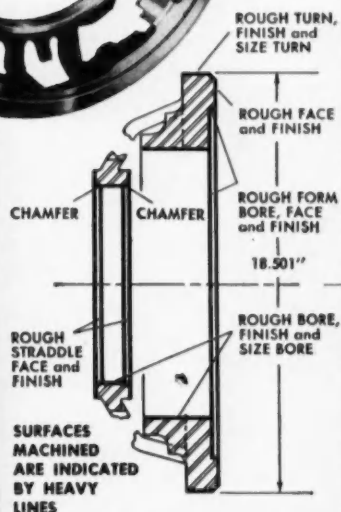
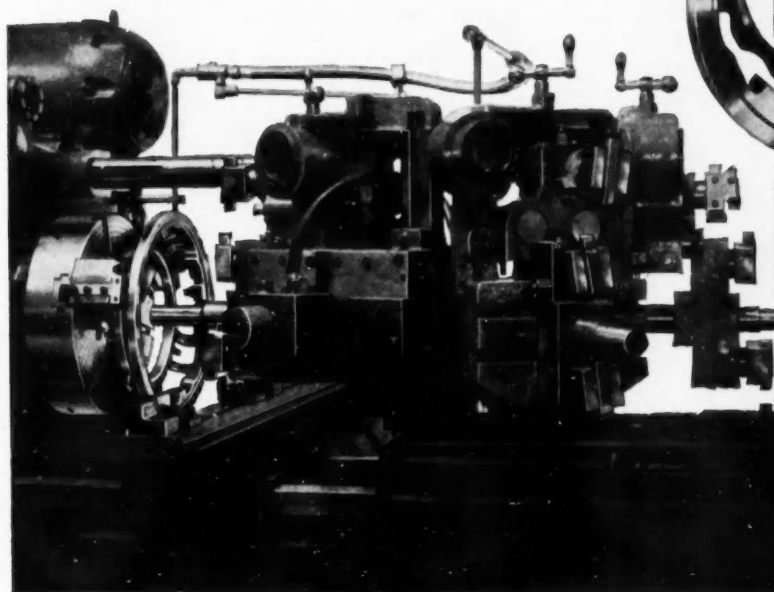


**AIR BRAKES**

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY • ELYRIA, OHIO • BERKELEY, CALIF.



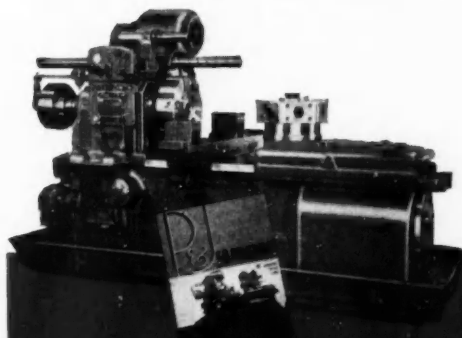
# DO IT BETTER, DO IT *AUTOMATICALLY*



## ...do it on a 5-DELX POWER-FLEX Automatic Turret Lathe with P&J Tooling

For example, the steel casting shown above required *twenty* separate machining operations all of which were accurately performed in a single, fully-automatic cycle . . . thanks to P&J Tooling on a P&J 5-DELX Power-Flex. Set for most effective speeds and feeds for each cut, P&J Automatics faithfully repeat the same cycle for every work piece without the chance of operator error. Operator fatigue is greatly reduced; one man can easily tend several machines allowing maximum opportunities for divided labor costs.

You can take guesswork out of your production picture . . . be sure of better work, lower costs and fewer rejects . . . when you do it automatically. Let today's outstanding production team—P&J Automatics plus P&J Tooling go to work for you. Send today for your copy of the 5-DELX Power-Flex Bulletin No. 131 — or ask P&J Tool Engineers to submit time and money-saving recommendations based on your own prints or sample parts.



FOR MORE INFO OR TO ORDER, WRITE: PRATT & WHITNEY, 100 N. 4TH ST., PITTSBURGH, PA. 15222. BRANCHES: ALBANY, N.Y.; ALBUQUERQUE, N.M.; ANCHORAGE, ALASKA; ARIZONA, PHOENIX; ARKANSAS, LITTLE ROCK; CALIFORNIA, OAKLAND; CONNECTICUT, BRIDGEPORT; DELAWARE, WILMINGTON; DISTRICT OF COLUMBIA, WASHINGTON; FLORIDA, MIAMI; GEORGIA, ATLANTA; ILLINOIS, CHICAGO; INDIANA, INDIANAPOLIS; IOWA, DES MOINES; KANSAS, WICHITA; KENTUCKY, LOUISVILLE; LOUISIANA, NEW ORLEANS; MAINE, PORTLAND; MARYLAND, BALTIMORE; MASSACHUSETTS, BOSTON; MICHIGAN, DETROIT; MINNESOTA, MINNEAPOLIS; MISSISSIPPI, JACKSON; MISSOURI, ST. LOUIS; MONTANA, BUTTE; NEBRASKA, OMAHA; NEVADA, LAS VEGAS; NEW HAMPSHIRE, PORTSMOUTH; NEW JERSEY, NEWARK; NEW YORK, NEW YORK; NORTH CAROLINA, RALEIGH; NORTH DAKOTA, GRAND FORK; OHIO, CLEVELAND; OKLAHOMA, OKLAHOMA CITY; OREGON, PORTLAND; PENNSYLVANIA, PHILADELPHIA; RHODE ISLAND, PROVIDENCE; SOUTH CAROLINA, COLUMBIA; SOUTH DAKOTA, SIOUX FALLS; TENNESSEE, MEMPHIS; TEXAS, DALLAS; UTAH, SALT LAKE CITY; VERMONT, MONTPELIER; VIRGINIA, RICHMOND; WASHINGTON, SEATTLE; WEST VIRGINIA, CHARLOTTE; WISCONSIN, MILWAUKEE; WYOMING, CHEYENNE.

### POTTER & JOHNSTON Co.

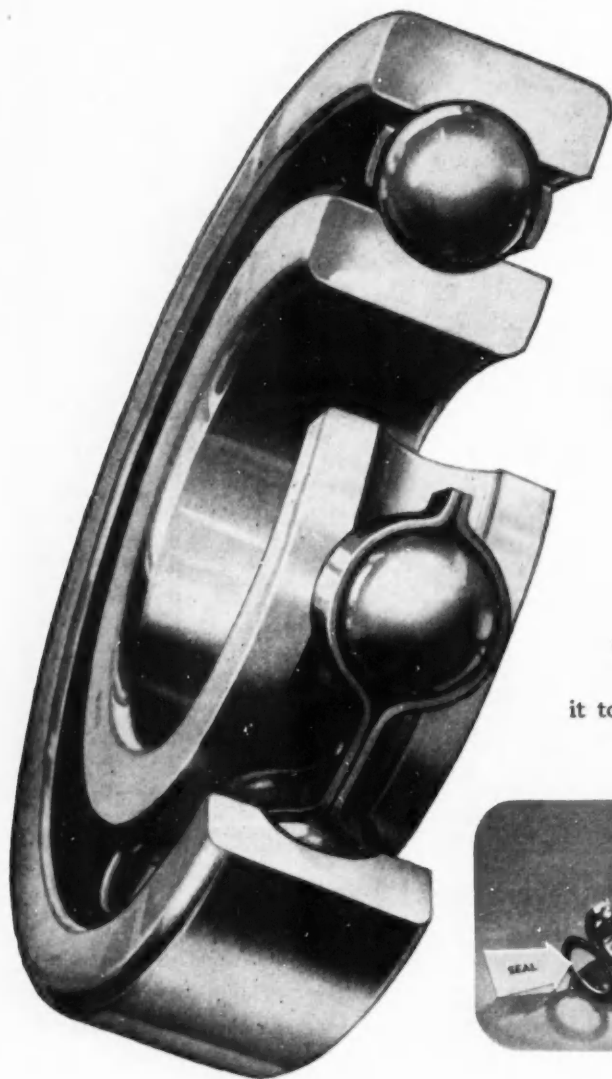
PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF

### PRATT & WHITNEY

DIVISION NILES — BEMENT — FOND COMPANY





where shafts must turn fast  
you'll find **SKF**  
**SINGLE ROW DEEP GROOVE**  
**BALL BEARINGS**

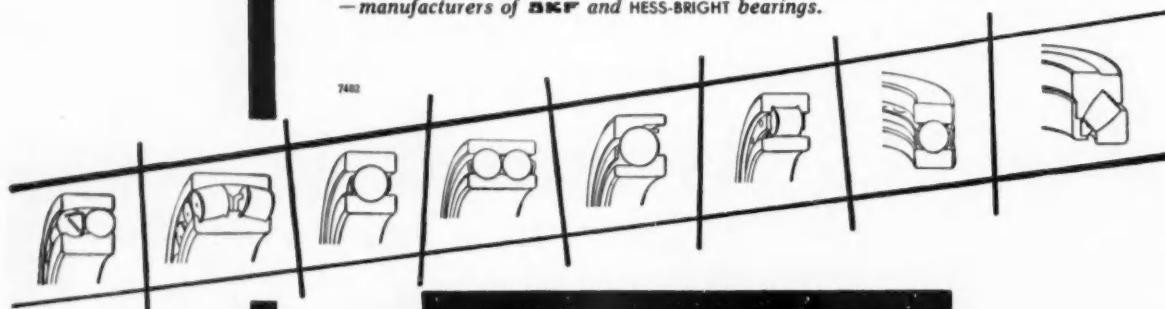
Look at the *contact* between the balls and the deep, continuous groove in each ring of this **SKF** bearing—contact that enables it to sustain not only radial load, but substantial thrust load, even at very high speeds.



Look further—**SKF** Single Row Deep Groove Ball Bearings are available with *any combination* of DuPont Fairprene seals, shields and snap rings: shields for excluding dirt; seals for retaining lubricant; snap rings for holding the bearing in lateral position in its housing.

Like all **SKF** Bearings, they're held well within established tolerance limits, tested for radial runout, carefully cleaned, protected from rust, strongly packaged.

Many **SKF** bearings are serving industry everywhere because **SKF**'s unmatched Field and Home Office engineering service helped product designers *put the right bearing in the right place*. **SKF INDUSTRIES, INC.**, PHILADELPHIA 32, PA.  
—manufacturers of **SKF** and HESS-BRIGHT bearings.

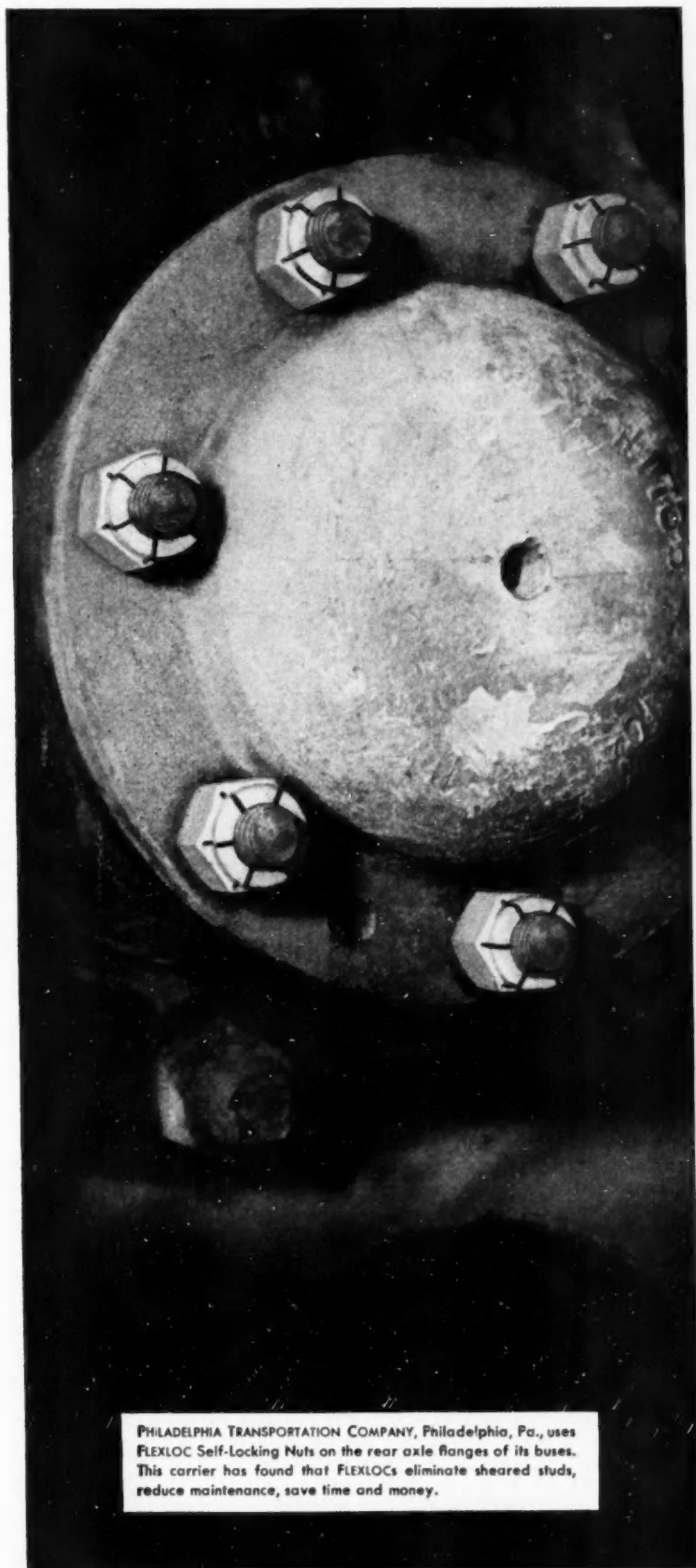


**SKF'S COMPLETE LINE OF ANTI-FRICTION BEARINGS, PLUS SKF ENGINEERING CO-OPERATION, HELPS YOU PUT THE RIGHT BEARING IN THE RIGHT PLACE.**

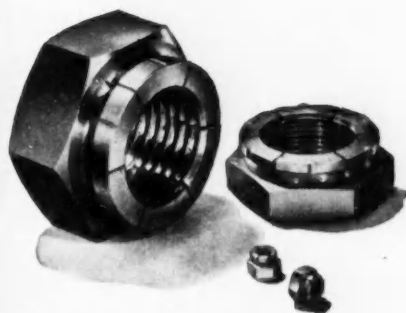
**SKF**®

BALL AND ROLLER BEARINGS





PHILADELPHIA TRANSPORTATION COMPANY, Philadelphia, Pa., uses FLEXLOC Self-Locking Nuts on the rear axle flanges of its buses. This carrier has found that FLEXLOCs eliminate sheared studs, reduce maintenance, save time and money.



## How **FLEXLOC** locknuts work

FLEXLOCs lock and stay put on a threaded member regardless of the vibration encountered. Here's how they work. The slotted top or locking section is divided into six equal, flexible segments, closed in to make the inside diameter of the nut smaller than that of the companion bolt. When the FLEXLOC is applied, these are expanded by the bolt. The spring tension of the resilient segments locks the nut securely at any desired position on the bolt once the locking threads are fully engaged.

FLEXLOCs can be used over and over again. When expanded by the bolt, the locking section remains within the elastic limit of the metal. This permits the locking segments to return to their normal position, ready for reapplication to the bolt.

FLEXLOCs are one piece, all metal—nothing to assemble, come apart, lose or forget. They can be delivered in any quantity in a wide range of sizes. Stocks are carried by industrial distributors everywhere. Write for literature and samples. SPS, Jenkintown 53, Pa.

**FLEXLOC**

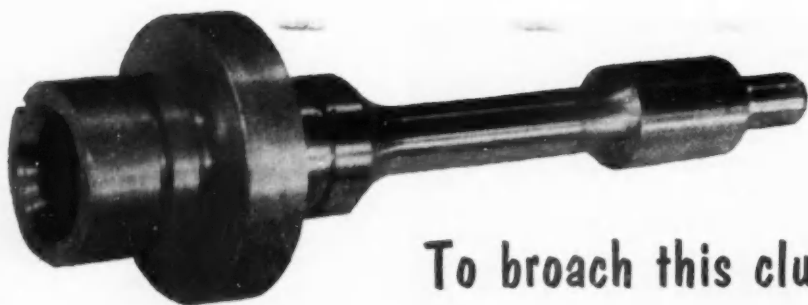
LOCKNUT DIVISION

**SPS**

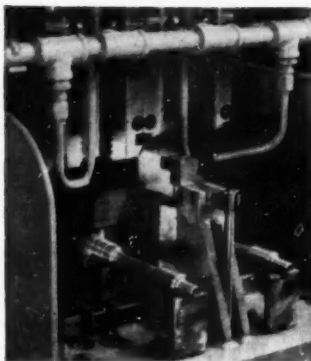
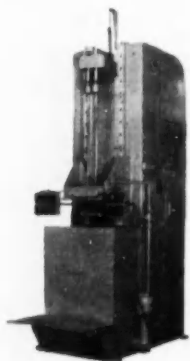
JENKINTOWN PENNSYLVANIA

*Our Fiftyth Year* : A START FOR THE FUTURE





To broach this clutch gear...



use this *American* machine... in this fashion...



...to get this result!

Approximately 300 clutch gears per hour can be broached on this American 3-Way Type Vertical Hydraulic Broaching Machine. A two station fixture is provided to locate parts in V-shape locators. Air clamping locks the parts into place. At the end of the broaching stroke the parts are automatically unclamped and the operator unloads them while returning the machine ram to starting position.

Flats approximately 5/16" wide are broached

on the diameter of the large end of the gear.

This broaching operation is a standard operation on a standard American machine. If your problem is more difficult, American has the experience and skill to devise a special machine, fixture or broach for your purposes. Send a part-print or sample for a recommendation leading to a solution of your broaching problem. Or send for catalog #300 which illustrates and describes standard American machines.



**American** BROACH & MACHINE CO.  
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

American Building - Ann Arbor, Michigan

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



All  
power trucks  
lift, move  
and stack

# BUT ONLY YALE GAS TRUCKS HAVE FLUID DRIVE



Smooth, trouble-free Fluid Drive gives you 3 to 8 times longer clutch life...saves costly, work-stopping clutch repair and too-frequent replacement.

Less down time is just one of the big advantages of Yale-exclusive Fluid Drive. You get continuous, stall-free operation... smoother stops and starts to protect your load as well as your operator.

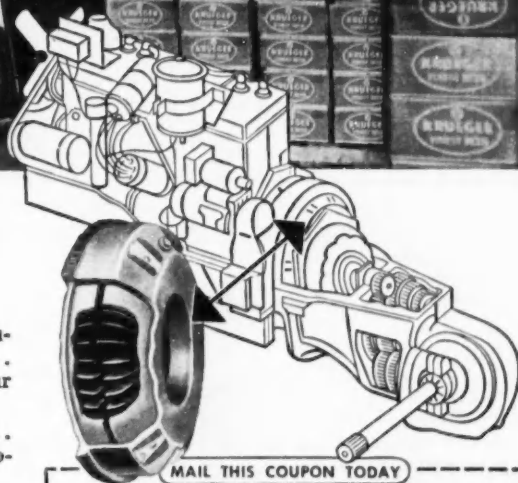
Other Yale Gas Truck features...many of them exclusive... include rugged 65 HP Industrial Engine—safer, surer Automotive-type Brakes—Shockless Steering—Hypoid Gears.

Yes, YALE Trucks and attachments lead in money-saving efficiency...cut costs as much as 75% in industries everywhere. And, every Truck YALE makes... Gas, Electric, Diesel, LP-Gas or Gas-Electric... is subject to rigid Quality-Control checks at every stage of manufacture.

**YALE\***  
MATERIALS HANDLING EQUIPMENT

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Gas, Electric, Diesel Lift Trucks • Worksavers • Hand Trucks • Hand and Electric Hoists • Pul-Lifts



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Yale Materials Handling Equipment.

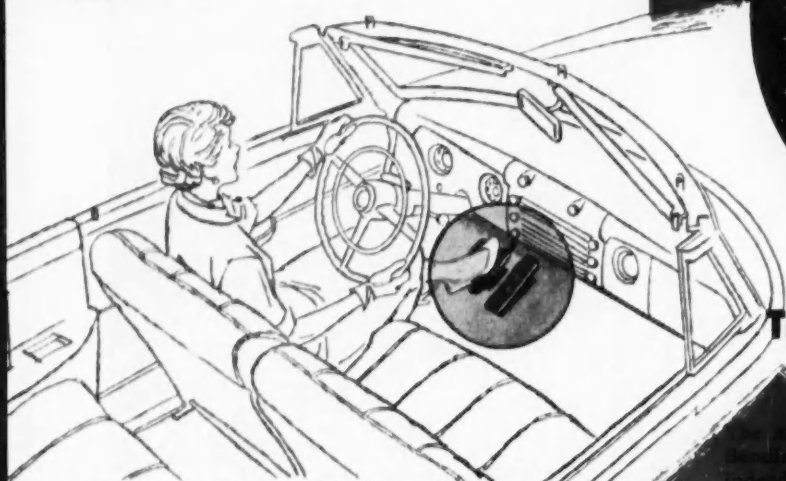
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Name \_\_\_\_\_ Title \_\_\_\_\_

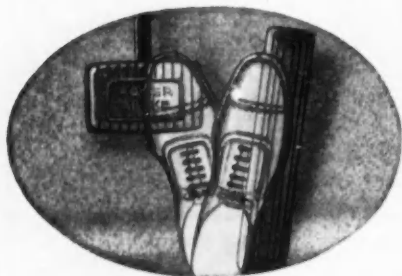
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**NOW** *Stopping*  
**IS AS EASY AS** *accelerating*

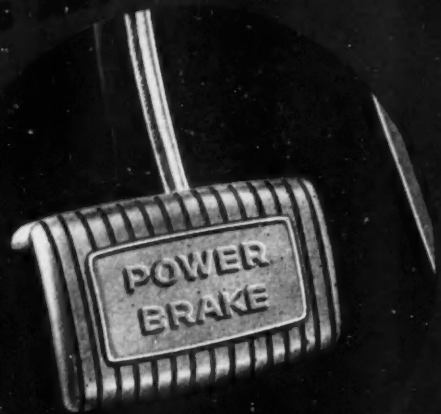


It is no longer necessary to lift the foot and exert leg power pressure to bring your car to a stop. With the Bendix Low Pedal Power Brake on about the same level as the accelerator, an easy ankle movement, much like working the accelerator, is all the physical effort required for braking. And by merely pivoting the foot on the heel, shifts from "go" to "stop" controls are made in far less time.

*Result!* **MORE DRIVING COMFORT, LESS FATIGUE AND GREATER SAFETY**

**Bendix  
Products  
Division**

**BENDIX Low Pedal  
Power Brakes**  
with a big  
Sales Advantage



**The Only Performance Proven  
Low Pedal Power Brake!**

The moment a prospect steps into a car equipped with a Bendix Low Pedal Power Brake, he recognizes that here indeed is a new car feature that will provide maximum protection from today's driving hazards. After even the shortest demonstration drive, the effortless, quick and powerful action of the Bendix Low Pedal Power Brake proves to be a new and thrilling experience in motor car control. That's why **STOPS** with Bendix Low Pedal Power Brakes—**STARTS** car manufacturers with a big sales advantage. This greatest improvement in braking since four-wheel brakes is unique in many ways. It is, for example, the only low pedal power brake that has won the test of millions of miles under all operating conditions. In fact, Bendix Low Pedal Power Brakes is specified by more manufacturers than any other make. Remember, too, this new low pedal power brake is the product of Bendix—world's largest producer of power brakes and leader in braking developments since the earliest days of the industry.

Take advantage of today's trend toward "power" operation by equipping your cars with the performance proven Bendix Low Pedal Power Brakes.

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DIVISION

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AVIATION SUPPLY COMPANY

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## High Spots of This Issue

HELP in obtaining more data about products advertised in **AUTOMOTIVE INDUSTRIES**, in addition to **Free Literature**, **New Equipment** or **New Product Information**, is given in the new inquiry postcard on Page 89 of this issue.

### ★ Chrysler Transmission Has High-Ratio Torque Converter

Analyzed in detail here is the new PowerFlite transmission for Chrysler Div. cars which combines a high performance torque converter with a two-speed planetary gearbox. Numerous illustrations complement the text. See Page 48.

### ★ Trailer Coach Industry Becomes Big Business

Although relatively new users of the nation's highways compared to other types of vehicles, "homes on wheels" have already become an important part of Automotive Americana. This is the amazing story of a small industry's growth. Page 52.

### ★ Latest European Aviation Developments

The French aeronautical industry recently put its best foot forward at a show in Paris. High quality was evident in both the design and construction of the planes exhibited, many of which are reviewed here. See Page 60.

### ★ Use of Diesels Quite Universal for German Farm Tractors

Well nigh all of the farm tractors shown at the recent German Agricultural Exhibition in Cologne were Diesel-powered, and many of these were aircooled. A written and pictorial analysis of prominent types is given here. Page 66.

### ★ Straight Line Setup for Casting Tank Hulls

Although now only in limited production, the huge plant of Birdsboro Armormat is being readied for volume output of hulls and turrets for the M-48 tank. This article describes its present form and the changes underway. Page 70.

### ★ 25 New Product Items And Other High Spots, Such As:

Transport vehicles of Czechoslovakia; how to protect yourself for defense contract termination; jet engine parts chilled for assembly; industrial mobilization realigned on broader base; details of Bendix linkage type power steering; one broaching machine does four operations on a single part; and tubeless tires as factory equipment on passenger cars.

*Automotive and Aviation News, Page 33*

*Complete Table of Contents, Page 3*

AUTOMOTIVE INDUSTRIES COVERS—  
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES  
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ENGINEERING PRODUCTION MANAGEMENT



## REQUIREMENT:

# Machine Ends of King Pin Boss AT LOWEST COST



Drawing of part broached on the equipment illustrated here. Heavy lines indicate broached surfaces.

Part name..... Steering knuckle support, right- and left-hand

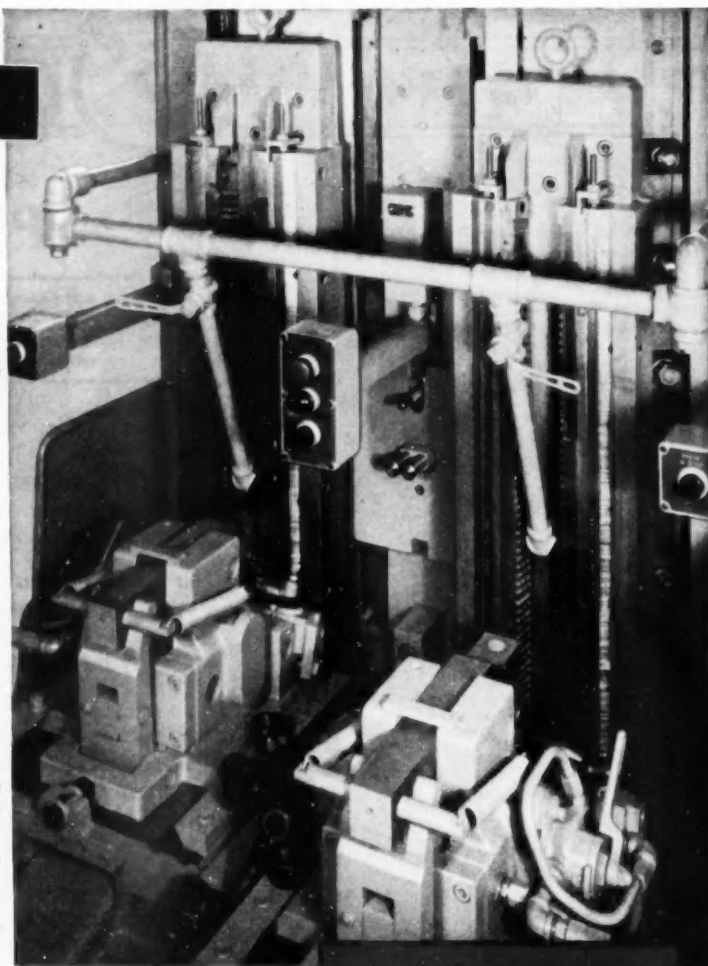
Material..... Steel forging

Operation..... Straddle broach king pin boss

Stock removal.....  $\frac{1}{8}$ " max.

Production..... 308 per hour

Machine..... CINCINNATI No. 5-54 Duplex Vertical Hydro-Broach, completely tooled up for production



Another dependable, low-cost application of Hydro-Broaching to automotive parts is illustrated here. A CINCINNATI No. 5-54 Duplex Vertical broaches king pin bosses on right- and left-hand steering knuckle supports at the production rate of 308 parts per hour. Air operated fixtures reduce physical effort, and Pre-Set Cycle Control (a standard machine feature) improves safety of operation. The latter feature stops the rams at the top of the stroke, and they do

not descend until the operator presses a button. Other advantages offered by CINCINNATI Duplex Vertical Hydro-Broach Machines include hardened ways; automatic pressure lubrication with manual flushing arrangement; easy, quick changing of broach holders (the job can be done in 20 minutes or less); ram speed control valve. Of course, these machines are in short supply at this time, but you might like to know more about them for future application. Ask for catalog No. M-1709-1.

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO



CINCINNATI No. 10-66 Duplex Vertical Hydro-Broach. Catalog No. M-1709-1 contains complete specifications. Write for a copy.

# CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES  
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

# News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 109, No. 3

August 1, 1953

## Defense Cuts Indicate Ample Vehicle Supply

Drastic reductions in automotive military contracts for tanks and trucks announced last month by the Defense Dept. indicates not only that requirements for these vehicles are coming into balance but also that the concept of single suppliers as the most efficient method of operation has gained acceptance.

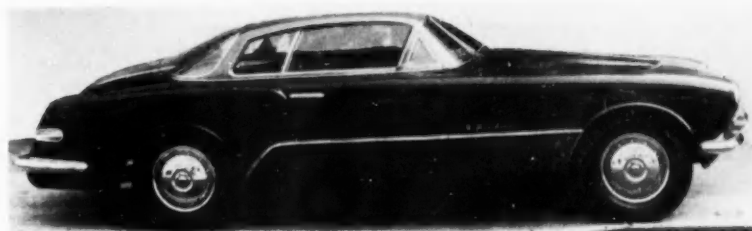
From all indications the supply of tanks and trucks on hand, together with output envisioned under the reduced program, is adequate to equip the Army and take care of replacement of vehicles destroyed in combat or worn out in normal usage. It is obvious from a production standpoint that the limited output can be turned out at much lower cost by a single supplier than if it were spread out to two, three or more companies.

It will be sometime later this month before industry will know which companies are the successful bidders and will continue to operate as the sole supplier for specific vehicles. Exceptions are Willys Motors, which will continue production of the  $\frac{1}{4}$ -ton jeep; Dodge Truck, which will continue to turn out  $\frac{1}{4}$ -ton ambulances and weapon carriers, and Pontiac, which will continue to build the Otter aluminum cargo and personnel carrier. These companies have been the only producers of these vehicles.

Suppliers will feel the effects of the cut. It also is considered likely that tank transmissions now being built by Allison at Indianapolis and Buick at Flint will be consolidated at the Allison Div.

## Ordnance Plans

An interesting development regarding the broad versus narrow base for defense operations is that Ordnance already is negotiating with Fisher and Ford for construction of warehouses near their tank plants for



## ITALIAN BODY ON AMERICAN CHASSIS

*The Pina Sport combines a three-passenger aluminum body by Vignali with a stock Cadillac engine and Hydra-Matic transmission. Stock components, such as Ford rear axle, keep down servicing problem. Each wheel has a telescopic shock absorber and an adjustable arm type to change riding qualities. Weight is 3000 lb, wheelbase is 115 in. Fina will build them in New York City in batches of six for \$9800 each.*

storage of machines and tools required for tank production, if and when their contracts are terminated. Ford, of course, definitely is going out of the work at the end of this year but Fisher's continuation will depend on the outcome of its bidding against Chrysler. The latter already has constructed a warehouse adjoining its Newark, Del., plant for storing tools in the event the contract is terminated.

Industry reaction to the cutbacks was very mild. In fact, its leaders have constantly pointed out that the U. S. economy does not depend on war work and that the lower expenditures for defense goods can lead to tax reductions and make more dollars available for civilian expenditures.

Even with the most recent reductions and others still to come, defense work will continue in fairly sizable volume in the automotive industry for the foreseeable future. There undoubtedly will be dislocations and hardships but for the long pull industry leaders believe that the less spent for defense goods the more will be available for buying its civilian products. About 20 per cent of industry production last year was accounted for by defense material so

that even a sizable cut in war work will not mean any great reduction in overall business.

## Hudson Plans Early Model Changeover

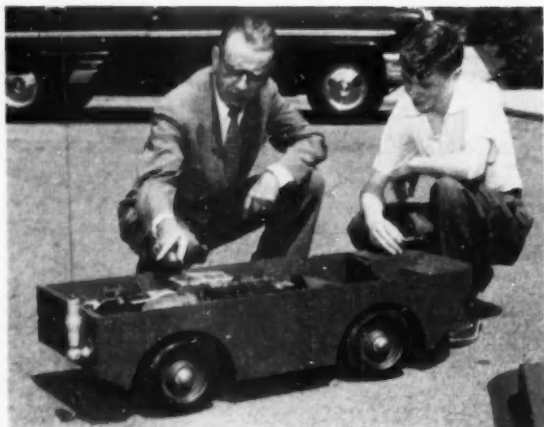
Hudson will be the first car maker to switch over to 1954 models, according to all indications. It has partially suspended its operations and laid off several hundred employees to rearrange assembly lines. It now looks as though the new model will appear sometime in August.

## Detroit Tool Shop Strike Settled

The 43-day strike of tool and die workers in Detroit was settled about the middle of July but not before it had delayed Chrysler's model changeover plans. Production of both DeSoto and Chrysler lines has been reduced to stretchout production to fill up the gap in the time schedule. It now looks as though Chrysler divisions will make the change in October.

General Motors' schedules apparently have not been delayed as much as those of Chrysler but it still is not known whether the strike will cause serious postponement from original target dates for model changeovers.

# News of the AUTOMOTIVE



## YOUTHFUL CRAFTSMEN

Greater emphasis on industrial arts and vocational education in schools is being encouraged by the Ford Motor Co., which sponsors an Industrial Art Awards contest each year. The 1953 test ended last month with final judging of 5000 entries, awards totaling \$45,000 to 1953 students. E. S. MacPherson, Ford vice-president, is shown inspecting a radio-controlled Jeep.

## Loss of Plane Job Blow for Kaiser

Loss of its \$423 million aircraft contract is a serious blow to Kaiser Motors in view of the sizable deficits it has been piling up in automotive operations since 1949. However, it probably will accelerate the company's program of consolidating its other facilities with those acquired from Willys Motors for more efficient and more economical automotive production.

It is understood that the announced moving of certain financial and accounting activities to Toledo is only the first in several projected consolidations with some of those to come of a more sizable scope. It is highly likely, for example, that the near future well may see all vehicles produced by the corporation assembled at Toledo. The next logical step would be use of the Willow Run facilities for all body production and parts manufacture which can be brought in from outlying plants.

## Packard Gets Credit of \$25 Million

Packard has negotiated a \$25 million revolving credit agreement with 14 banks over a 5-year period. The purpose of the credit is to free a portion of its investment in defense contracts for use in civilian operations. At the end of March Packard's investment in receivables and inven-

tories under its defense program totaled about \$29 million. The company does not intend to borrow under the agreement this year.

## Outlook Depends on Where You Sit

Perhaps the most striking phenomena of the current automobile industry situation is the difference of opinion about sales prospects for the rest of the year. In general the optimists and the pessimists cleave into two schools roughly along the lines of the Big Three and the independents, respectively, with a sort of sub group of more conservative optimism among the stronger independents.

The sideline observer cannot escape the direct relationship between point of view and current success in the market place of the individual company's product.

Ford appears to be the most optimistic at the moment, saying that it will build more cars in the last half than it did in the first. However, it must be conceded that the company has a lot of lost ground to recover after disastrous strike troubles in its own and supplier plants. GM is a bit vague about its last half plans, other than that production will remain high but is not likely to reach first half totals. Chrysler also has expressed optimism about continuing a high level of output, although it has been set back by a delay in new model tool-

## Improved Sealed Beam Headlamp Developed

A basic improvement in automobile and truck headlighting is under development and could be here by 1955. A joint project between the automobile industry and electrical equipment suppliers, the development encompasses a new design of sealed beam lamp which gives better road illumination and more contrast to objects in the roadway, with somewhat improved anti-glare characteristics. Seeing distance ahead is greater than in present lamps and more light is thrown to the right-hand side of the roadway. Also illumination is better in fog and rain, and "flash" glare is much less for approaching drivers at close range. The new unit, however, must first be approved by motor vehicle administrators, laws will have to be changed in some states, and suppliers will have to tool up.

ing which has caused some stretchout of current models.

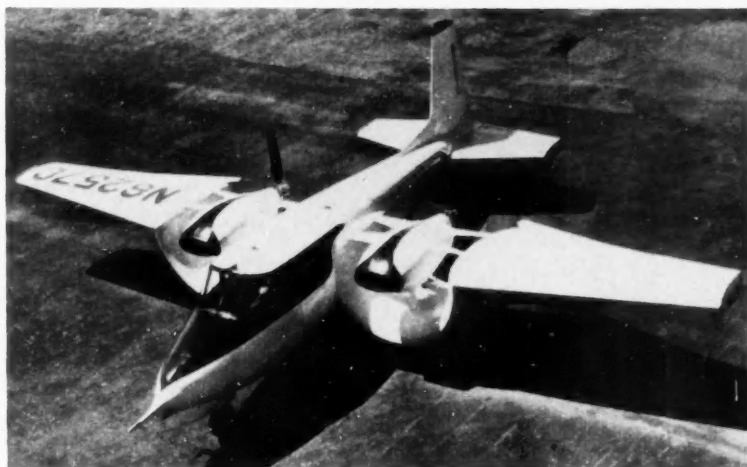
## Competition Restrained

The independents are a bit more restrained, with some of them actually on the glum side. In short, the industry appears to be reverting to something more approaching the pre-war pattern for the first time since 1940. However, the best guess now is that production the last six months of the year will not match that of the first, when 3.2 million cars were turned out. It appears the total for the year should register in the neighborhood of 5.8 to 6 million cars, far better than forecasts at the outset of 1953, and the second best in history.

Total vehicle output also should be the second highest on record, since truck production should exceed one million, for a total car and truck turnout of approximately seven million units.

Production records were set by two GM divisions during the first six months. Buick had its best six-month period, and Chevrolet had its best first half. Mercury was setting records almost daily since July 8.

# AND AVIATION INDUSTRIES



United Press

## CHANNEL WING ON TRANSPORT

The Custer channel wing is being tested on a Baumann Brigadier five-passenger twin pusher. Purpose is to permit short takeoff and landing runs, as well as near-hovering. Recent NACA wind tunnel tests of another Custer channel wing plane disputed the designer's claims for performance characteristics.

## Fuel for Cars Reaches Aircraft Level

The oil industry appears to be keeping up with the higher compression engines. Leonard Refineries, Inc., operating exclusively in Michigan, now produces a 96 octane gasoline designed to sell for one cent a gallon more than other premium gasolines, which have an octane number of slightly less than 92. The new fuel is very near the 100 octane level which a few years ago was available only for aircraft. The extra price premium, however, raises some question about the savings which are supposed to result from higher compression engines using high octane fuels.

## New Rayon for Tires

A new high-tenacity rayon yarn for tires, to be sold under the trademark Super Cordura, has been developed by the du Pont Co. The new rayon puts du Pont in the position of competing with itself for the premium tire cord yarn market.

The yarn is 20 per cent stronger and has substantially greater fatigue resistance than existing high-tenacity yarn.

A unit of the company's Spruance rayon plant at Richmond, Va., is

being converted to produce the new yarn by September, and will be in full production by January, 1954.

## Halpin to Head F. L. Jacobs Co.

Carl Halpin, Detroit industrial engineer and consultant, has been named president of F. L. Jacobs Co. He succeeds James D. Mooney, former president of Willys, who assumed the position last December pending appointment of a permanent president. Mr. Halpin has been a consultant since 1942. Prior to that he was associated with Packard, Fisher Body, and Fruehauf.

## R. H. Grant Retires

R. H. Grant, one of the pioneers in modern salesmanship, has retired from the General Motors board of directors after 33 years' service with the corporation. He joined GM in 1920 when Delco-Light, of which he was president, was acquired by the corporation and helped establish GM in the home appliance field as president of Frigidaire. His greatest success, however, was in bringing Chevrolet from a minor division to a leader in the automotive industry between 1924 and 1929.

## Wisconsin Motor Buys Sterling Truck Plant

Wisconsin Motor Corp. has bought the former Sterling Motor Truck plant at West Allis, Wisc., from White Motor Co., which acquired it when it purchased Sterling in 1951. All truck operations have been moved to the White home base at Cleveland. Wisconsin Motor will use the 143,000 sq ft facility to increase its output of air cooled engines by about 60 per cent. The Sterling plant is located practically adjacent to Wisconsin's present plant. Cost is reported to be about \$410,000.

## D & C Navigation Buys Interest in Fruehauf

Detroit & Cleveland Navigation Co., an old line firm in the transportation business, has bought a nine per cent stock interest in Fruehauf Trailer Co. The company ceased operating boats on the Great Lakes three years ago, but currently has a controlling interest in Denver Chicago Trucking Co. The firm purchased the stock interests of Harvey C. Fruehauf, who retired May 7 as chairman of the company and now serves as honorary chairman and a director. The purchase will give Geo. J. Kolowich, president of D & C, a much more commanding position than the nine per cent interest would indicate, since his firm will be actually second largest shareholder because the stock is widely held by nearly 9400 stockholders. Only larger shareholder is the Fruehauf family, which controls a little more than 10 per cent directly and through trusts.

## Pontiac Offers New Hand Drive Controls

Pontiac has developed a new hand-operated accelerator and brake control for handicapped drivers as optional equipment. The new unit at \$75 is much cheaper than the vacuum operated type formerly used which sold for \$200. Installation charges are extra. The new system includes a left foot accelerator and three steering wheel grips, and can be installed at the factory or by the dealers.



# News of the AUTOMOTIVE

## New Planes Revealed by AF, Builders

Republic Aviation Corp. is working on a new, high-speed fighter-bomber, the F-105, which is expected to become a powerful weapon for close support of ground troops, some years hence. Air Force headquarters is keeping quiet on details of the new aircraft, reported to be intended as an eventual replacement for the Republic F-84. The new plane was referred to in a regulation outlining research and development procedures.

Prototype of the USAF North American F-100 supersonic jet fighter was successfully test flown recently at Edwards Air Force Base, Muroc, Calif. The plane is in production at North American's Los Angeles plant.

New Boeing Stratofreighters, designated KC-97G, now are being delivered to the Air Force. The airplanes are joining tanker squadrons of the Strategic Air Command. The new 350-mph transports now are in large scale production at the Boeing-operated Renton (Wash.) plant. The com-

pany revealed that a contract has been received for a substantial quantity of the new freighters.

The new KC-97G, through relocated aerial refueling tanks, can carry cargo items without removal of the refueling equipment. Another new feature is the provision for installation of external fuel tanks.

The successful first flights of a flight test bed for research on supersonic-type propellers was announced by the Air Force's Air Research and Development Command at Baltimore, Md. The project is being accomplished with the cooperation of the Navy's Bureau of Aeronautics and the National Advisory Committee for Aeronautics.

The flight test bed, a McDonnell XF-88B, is equipped with an XT-38 Allison turboprop engine which powers a single propeller, in addition to the aircraft's regular powerplant of two J-34 Westinghouse turbojet engines.



### ON BORROWED GROUND

Production at the Vellumoid Co. was resumed in a building belonging to the Norton Co. after the tornado of last June. Ten days after the holocaust, Vellumoid was operating at 85 per cent of capacity, and in three weeks was back at 100 per cent. Most cutting dies and gasket fabricating machines were undamaged.

## British Firm Plans Novel DC-3 Type

Aviation Traders (Engineering) Ltd., a British aircraft subcontractor, has evolved a design for a new airliner to replace the DC-3.

The design is for a conventional low-wing aircraft, powered by two Rolls-Royce Dart turboprop engines. It would seat 23-33 passengers in a pressurized cabin. The complete nose of the aircraft (including the crew compartment) is designed to swing to one side on hinges for bulky freight to be loaded.

The estimated performance gives 315 mph cruising speed over ranges of 200-800 miles, including full reserves. Landing and take-off runs would be short—under 1000 yd with full allowances. The all-up weight will be 21,000 lb.

The fuselage is a symmetrical streamlined shape, chosen because of its great advantages aerodynamically and structurally. Although this shape is generally considered expensive to build, Aviation Traders feel they can solve the difficulties by using the petal method of construction. Instead of using stretcher presses to induce double-curvature in skin sheets, the identical skins, which run almost the whole length of the aircraft, are cut to their final shape in the flat, and the double-curvature is induced during assembly.

The formers and stringers are riveted to each petal, which is then placed on a final assembly jig. Tips of the petals are closed in manually to complete the cigar-shaped fuselage. The metal skin is therefore stretched to its final shape, without wrinkling. After the fuselage has been completed, the windows, doors, and aper-

tures for wing attachments are cut.

### Bendix Glider Trophy

Eclipse Machine Div. of Bendix Aviation Corp. again awarded its gold, silver and bronze trophies to the three top distance glider pilots participating in the 20th national searing contest at Elmira, N. Y. The awards went for flights of 225, 204, and 195 miles respectively.

# AND AVIATION INDUSTRIES

## Temco Will Prove Design Claims

Temco Aircraft Corp., Dallas, Texas, will develop aircraft of its own design for the military services, in addition to subcontracting major assemblies for other manufacturers.

The decision followed termination of its F3H Demon prime contract, although the company will increase employment to produce several major assemblies of the F3H, amounting to about 35 per cent of the total airframe for McDonnell Aircraft Corp.

TEMCO's increased emphasis on its own designs will include not only participation in design competitions for both trainer and combat aircraft, but development at company expense of one or more of its designs to the prototype stage. Proposals submitted to both the Air Force and the Navy during the past year and a half, the firm said, have drawn extremely favorable comment, but some of Temco's appraisals of cost, performance and lead-time required have been so advanced as to appear optimistic. Temco says it will build flying articles at its own expense, and deliver them to the services for evaluation.

## Chevrolet 105 Shell Contract Increased

Chevrolet Div. of General Motors has received another increase in its army contract for 105 mm. artillery shells. Size of the increase was not divulged but it brings total value of orders for the shells since Chevrolet resumed operation of the shell plant in St. Louis in 1951 to more than \$100 million. Since taking over the plant two years ago the division has produced more than 14 million shells.

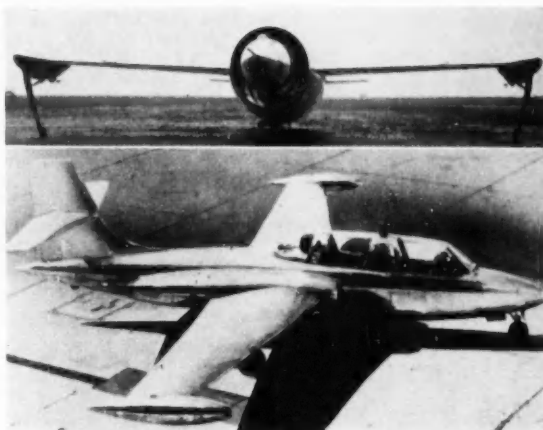
## Longer Trailer Legal

An amendment to California's motor vehicle code to legalize 40-ft semi-trailer lengths concludes a long industry effort to obtain uniformity among Western states on trailer equipment. It is now possible, according to the Western Highway Institute, for fleet owners to legally operate 40-ft trailer equipment in all 11 Western states and Alaska, resulting in important economies.

## FOR TEST, TRAINING

Two new planes shown at the 20th Salon at Paris were the Leduc experimental 021 ram-jet light fighter, top, featuring a prone cockpit concentric with the air entrance, and the Fouga CM-170 Magister light fighter-trainer with two Marbore engines of 880 lb thrust. The Leduc may have Marbore engines added at wingtips. Five Magisters will be built by SNCASE.

United Press



## A. O. Smith to Build Frame Plant in Ill.

A. O. Smith Corp. will start construction soon of a \$5 million automobile frame manufacturing plant at Granite City, Ill. The company has acquired an 80 acre tract there within a mile of Granite City Steel Co. which will supply substantial quantities of steel to the frame operations.

The new plant will supply not less than 40 per cent of Chevrolet's annual passenger car frame requirements. Production is expected to start early next summer. The Granite City operation will be the first Smith frame plant located away from Milwaukee and will supply frames for Chevrolet plants at Janesville, Wisc., Kansas City, St. Louis, and Van Nuys and Oakland, Calif.

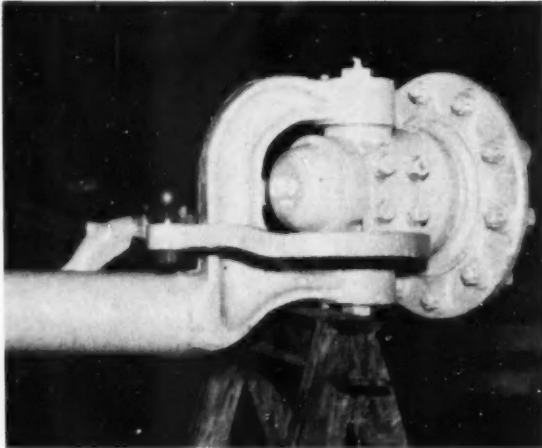
## 1953 NEW PASSENGER CAR REGISTRATIONS\*

Arranged by Makes in Descending Order According to the 1953 Five Months' Totals

MAKE	FIVE MONTHS						
	May 1953	April 1953	May 1952	Units		Per Cent of Total	
				1953	1952	1953	1952
Chevrolet	129,784	126,378	87,033	532,692	361,094	22.79	21.08
Ford	90,112	85,273	70,670	403,000	286,835	17.24	16.71
Plymouth	54,207	53,920	45,237	244,132	188,367	10.44	10.96
Buick	43,549	43,465	31,040	189,218	130,995	8.09	7.63
Pontiac	38,314	36,549	26,236	181,021	107,175	6.99	6.24
Oldsmobile	31,690	30,278	22,062	133,239	92,120	5.70	5.37
Dodge	30,249	30,524	27,662	126,732	99,672	5.51	5.81
Mercury	21,317	21,250	18,240	101,700	72,977	4.35	4.26
Nash	15,076	16,077	15,478	72,509	65,467	3.10	3.23
Studebaker	19,318	16,614	16,333	86,972	74,131	2.86	4.32
Chrysler	14,771	15,099	11,434	66,248	49,616	2.83	2.89
De Soto	11,620	11,496	9,150	50,678	38,636	2.18	2.25
Cadillac	9,726	9,770	8,302	46,137	33,716	1.97	1.96
Packard	7,725	8,057	6,899	36,829	27,796	1.68	1.82
Hudson	7,541	7,491	8,270	31,208	32,069	1.33	1.87
Willis	4,521	4,918	3,876	23,413	13,310	1.00	.78
Lincoln	4,596	4,011	2,806	16,553	9,669	.71	.56
Kaiser	2,559	2,731	3,868	12,781	15,846	.85	.92
Henry J	1,000	1,201	1,435	5,927	13,451	.25	.76
MG (British)	730	638	688	3,246	2,401	.14	.14
Hillman (British)	406	448	404	2,061	1,668	.09	.10
Ford (British)	303	390	327	1,961	1,473	.08	.09
Jaguar (British)	339	402	245	1,775	1,071	.08	.06
Austin (British)	275	353	540	1,658	2,110	.07	.12
Alfa Romeo	57	55	178	321	567	.01	.03
Misc. Domestic	215	282	424	960	2,358	.04	.12
Misc. Foreign	593	608	376	2,829	1,660	.12	.10
Total—All Makes	540,575	528,278	422,217	2,338,000	1,716,220	100.00	100.00

\* Based on data from R. L. Polk & Co.

# News of the AUTOMOTIVE



## NO SNAP

Steering turning radius on this truck front axle is on the centerline of the wheel, to eliminate wheel snap on bumps. Ball bearing surfaces are nylon. Page and Page of Portland, Ore., says 100 are in use, and that most truck makers are testing it.

## Continental Plans Jet Engine Plant

Continental Aviation and Engineering Corp. is planning to build a \$1.5 million plant at Muskegon, Mich., for production of jet aircraft engines. The company did not release any details as to the type of engine to be built, the size of the plant, or contemplated employment. Contracts for the new plant will be awarded in September with part of the financing to come from local sources.

## Utica Bendix May Expand

The possibility of the significant expansion of the Utica Div. of Bendix Aviation Corp. in the future was key-noted in an announcement by Donald M. McGrath, general manager, that the total production of the plant is to be gradually channeled into the aircraft accessories field. When full production is resumed there is a "strong possibility" that employment will rise well beyond the 2000 level, which was anticipated when Bendix opened the Utica Division.

## Sheet Steel Mill Opens New Market

Pittsburgh Steel Co. officially entered a new market last month by taking the wraps off a \$28 million mill to produce steel sheets.

The modern semi-continuous hot rolled sheet mill is the largest installation of its kind to be built for more than a decade in the Pittsburgh district. The company unveiled the 66-in. hot mill at Allenport by putting it through its paces publicly for the first time. Previously the mill had shipped body steel to at least two makers, Chrysler and Packard.

During the 1940's, Pittsburgh Steel was a marginal producer, with wide fluctuations in production, employment, and in earnings. In 1950 a \$62.8 million expansion program began, largely to increase finishing facilities beyond the capacity to produce ingots. Also, the range of products was diversified; previously the firm limited itself to wire, wire products, and seamless tubular products. One third of the company's ingot tonnage had gone to conversion channels.

When completed, the expansion program will provide an increase in blast furnace capacity by 12 per cent, an increase in open hearth capacity by 50 per cent, five new soaking pits and a new 66-in. high-lift blooming-slabbing mill, and an increase in finishing facilities of 82 per cent.

Facilities for cold rolling steel sheet, under construction, are expected to be in operation in the latter part of this year. Hot and cold rolled sheet and strip production will then build up to 600,000 net tons per year.

Among the mill's suppliers are Automatic Transportation Co., E. W. Bliss Co., Cincinnati Milling Machine Co., Cleveland Crane Co., Cutler-Hammer, Inc., General Electric Co., Reliance Electric Co., Wean Engineering Co., and Westinghouse Electric Corp.

## 1953 RETAIL CAR SALES BY PRICE GROUPS\*

### NUMBER OF CARS

Price Group	May				Five Months			
	1953		1952		1953		1952	
	Units†	% of Total	Units†	% of Total	Units†	% of Total	Units†	% of Total
Under \$2,000	282,927	64.46	218,878	52.19	1,282,035	53.88	910,907	53.42
\$2,001 to \$2,500	185,923	29.44	121,487	28.96	653,874	26.14	525,164	30.80
\$2,501 to \$3,500	69,787	12.98	61,027	14.55	319,824	13.78	201,748	11.83
Over \$3,500	22,194	4.12	18,026	4.30	96,131	4.22	67,428	3.95
Total	637,791	100.00	419,528	100.00	2,323,864	100.00	1,705,247	100.00

## DOLLAR VOLUME OF SALES\*

Price Group	May				Five Months			
	1953		1952		1953		1952	
	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total
Under \$2,000	\$522,243,006	45.97	\$387,443,796	43.74	\$2,243,304,179	45.29	\$1,607,095,950	45.03
\$2,001 to \$2,500	340,176,401	29.95	260,939,394	30.36	1,461,190,558	29.50	1,165,202,795	32.65
\$2,501 to \$3,500	191,283,258	16.84	163,574,770	18.47	877,580,795	17.72	548,770,505	15.38
Over \$3,500	82,272,884	7.24	65,829,796	7.43	370,920,057	7.49	247,612,591	6.94
Total	\$1,135,975,549	100.00	\$885,787,716	100.00	\$4,952,975,589	100.00	\$3,568,681,841	100.00

\*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four door sedan or equivalent model. Does not include transportation charges or extra equipment.  
†—New registrations of American made cars only. Does not include imported foreign cars.

## More Stamping Set for Buffalo

The Ford Motor Co. announced that it is embarking on a giant \$5 million expansion program at its Buffalo, N. Y., stamping plant. Plans call for adding two new press lines in addition to blanking and rolling equip-

# AND AVIATION INDUSTRIES

ment. No new operations will be undertaken. A total of 13 major presses have been ordered for the expansion program.

According to present plan, the first of the plant presses will be installed by the first of the year, with all 13 ready for operation by March. Plans call for installation of three blanking presses, three shearing lines, two McKay rollers and an uncoiler. Largest will have a 144-in. bed.

Addition of the new press lines will enlarge the plant's production capacity by 10 per cent. The lines will be used for die tryout, providing parts depots with service parts and running current model stampings that are behind production schedules.

## Steel Supply Improves

Steel mills may be catching up with demand for the kinds of steel that have been hard to get, if the experience of the Ford Buffalo, N. Y., stamping plant, largest user of sheet steel on the Niagara Frontier, is any yardstick. A spokesman said more steel tonnage is being delivered now than at any time since the plant opened.

A month or six weeks ago, Ford was crying for steel. Three months ago, the steel supply looked so gloomy that Ford bought in the European market. The steel it ordered in Europe arrived only recently at the Buffalo stamping plant and at Ford plants in the Detroit area.

The Buffalo stamping plant now uses 2500 tons of steel a day. Half of it comes from Bethlehem's Lackawanna plant, the rest from Great Lakes Steel, Ford's own steel mills and right now, from Bethlehem's plant in Sparrows Point, Md.

Production at the Ford stamping plant here is at a record level and peak operations are assured through November. Higher production will require an additional 200 tons of steel daily.

## Ford May Put Stamping Plant at Cleveland

There is increasing evidence that the automotive industry is attempting to locate its operations close to basic



## SPACEMAKER WITH PANCAKE

Freightliner Corp. introduced its Spacemaker truck chassis, which uses the new Cummins NHHB-600 horizontal engine. A 24-ft body is used on a 28-ft chassis. Chassis weight is 13,094 lb. Several are scheduled for production in the summer.

steel sources. It is reliably reported that Ford is negotiating for a plant site at Cleveland for a large stamping plant which would be near large steel facilities there.

At Detroit, the two largest steel producers in that area, Great Lakes Steel Corp. and McLouth Steel Corp., have huge expansion programs under way which, when completed, will provide capacity of almost one-third of the automobile industry's entire annual requirements. General Motors

will help finance the McLouth expansion by purchasing \$25 million worth of preferred stock. American Metal Products Corp. also will buy \$2 million of the preferred stock. Estimated capacity of Great Lakes and McLouth facilities after expansion programs are completed will be 4.6 million tons. The McLouth program will cost \$106 million.

Continued on Page 98

## 1953 NEW TRUCK REGISTRATIONS\*

Arranged by Makes in Descending Order According to the 1953 Five Months' Totals  
FIVE MONTHS

MAKE	May 1953	April 1953	May 1952	Units		Per Cent of Total	
				1953	1952	1953	1952
Chevrolet.....	31,237	33,103	24,942	144,821	108,794	38.35	33.23
Ford.....	23,408	22,936	16,605	96,336	78,717	24.19	23.12
International.....	9,389	10,011	8,113	44,584	37,320	11.19	11.40
Dodge.....	7,338	8,694	7,979	39,969	38,728	10.04	11.83
G. M. C.....	7,767	8,485	6,986	37,549	32,145	9.43	9.62
Studebaker.....	2,320	2,524	2,015	11,572	11,946	2.91	3.96
White.....	1,191	1,225	954	5,246	4,716	1.32	1.44
Willlys Truck.....	762	684	681	4,351	4,323	1.09	1.32
Willlys Jeep.....	632	792	663	3,946	3,202	.99	.99
Mack.....	572	710	607	2,823	2,976	.71	.91
Reo.....	328	396	247	1,616	1,230	.41	.38
Diamond T.....	362	314	314	1,442	1,086	.36	.46
Divco.....	248	201	256	968	1,399	.24	.40
Brockway.....	191	169	150	671	701	.22	.21
Autocar.....	183	166	116	724	671	.19	.20
Federal.....	56	61	50	391	336	.10	.10
Kenworth.....	34	94	59	295	300	.07	.09
Pontiac.....	46	36	31	193	245	.06	.07
F. W. D.....	16	18	39	136	233	.03	.07
Peterbilt.....	1	25	20	61	96	.02	.03
Misc. Domestic.....	44	61	130	273	1,024	.07	.31
Misc. Foreign.....	19	20	34	121	161	.03	.06
Total All Makes.....	66,366	91,127	71,690	390,295	327,461	100.00	100.00

\* Based on data from R. L. Polk & Co.



# Men in the News



**Hanson-Whitney Co.**—Edward P. Cody and Ralph Edwards are now general managers respectively of small tools and gages, and machine tools.



**Plymouth Motor Corp.**—Appointment of K. G. Pound to the new position of sales administrative executive is announced. F. C. Bischoff is director of distribution.



**Warner Electric Brake & Clutch Co.**—Fay Carlson is now manager of quality control, and Charles Modersohn is chief engineer of the industrial division.

**National Tube Div., USS**—H. J. Wallace, vice-president in charge of sales, has been loaned to the U. S. Dept. of Commerce as deputy director of the Iron and Steel Div. of NPA.

**F. L. Jacobs Co.**—Carl Halpin has been elected president, succeeding James D. Mooney, who will serve as a director.

**Borg-Warner Corp.**—A. P. Emmert, former president of Warner Gear Div., succeeds A. J. McAllister as president of the Detroit Gear Div. A. W. Rose has resigned as vice-president and assistant general manager of Warner Gear to become Pacific Coast representative of B-W.

**Cesana Aircraft Co.**—Sid Shannon is now sales representative of the Helicopter Div.

**General Electric Co., Aircraft Gas Turbine Div.**—Edward V. Albert has been appointed product planning engineer for transport aircraft.

**Aluminum Co. of America**—G. D. Welty has been named to the new position of manager of aircraft sales. M. W. Hodgdon succeeds him as manager of forging sales.

**North American Aviation, Inc.**—Stanley C. Hellman has been named assistant director of contract administration.

**Kelite Products, Inc.**—Richard C. Martin is now national sales director.

**Flying Tiger Line**—Harold M. Bauer has been appointed coordinator on contract operations.

**Axelson Mfg. Div., Pressed Steel Car Co.**—Willard F. Goertz recently became general sales manager.

**Bardwell & McAlister, Automotive Div.**—Jack C. O'Toole has been appointed general sales manager.

**Stewart-Warner Corp., South Wind Div.**—William W. Pace has been appointed advertising manager.

**Budd Co.**—William W. Ramsay has been appointed head of Central Material Control.

**Thor Power Tool Co.**—J. A. Hill, John A. McGuire, B. H. Johns, and W. B. Hunn are now vice-presidents.

**Waukesha Motor Co.**—Lee W. Melcher, head of the railway and refrigeration division, retired yesterday.

**Budd Co.**—New assistant works manager in charge of method and equipment at the Hunting Park plant is Matthew A. Cavanaugh.

**Evans Products Co.**—Donald R. Ward has been promoted to assistant to the president.

**Piasecki Helicopter Corp.**—John W. Cole has joined the firm as chief of flight test.

**Airborne Accessories Corp.**—Fred Sansonetti was raised to assistant general manager.

**Longren Aircraft Co.**—Arthur Robertson has joined the firm as general manager.

**Stanley Aviation Corp.**—The new position of executive engineer is filled by Benson Hamlin.

**Seiberling Rubber Co.**—George A. Wiedemer has retired as manager of truck tire sales, and is succeeded by C. Sterling Parker.

**Convair**—Charles F. Horne has joined the firm as manager of the Pomona, Calif., division. August C. Esenwein is now vice-president in charge of the Ft. Worth, Tex., division. Frank Pace, Jr. and Lawrence B. Richardson were elected vice-chairmen of Convair and Canadair, Ltd., respectively.

**Stewart-Warner Corp.**—Thomas J. Tucker fills the new position of assistant controller.

**AC Spark Plug Div.**—Andrew J. Dunkle is new director of works standards.



**Dynamic Corp., subsidiary of Eaton Mfg. Co.**—Edward H. Fredrick is now assistant general manager.

**Berger Manufacturing Div., Republic Steel Corp.**—Charles E. Howes has been appointed general manager of sales.

**Quaker Rubber Corp.**—K. A. Allen has been chosen director of national accounts.

**Fafnir Bearing Co.**—Clarence G. Rosensweig has been elected vice-president, while Richard F. Cooper is now vice-president and works manager.

**Federal-Mogul Corp.**—Samuel E. MacArthur, treasurer and controller, has been elected a director.

Hupp Corp.—**Victor A. Olsen** has become an executive consultant for the firm and for AMgears, Inc.



**Standard Pressed Steel Co.**—**James L. MacDowell** has been named manager of tooling and quality. **James B. Snyder** has been promoted to chief accountant.

U. S. Rubber Co.—**David E. Durst** is now manager of industrial relations of the international division.



**Chrysler Div.**—**Jack W. Gleeson** is now director of business management. **E. M. Braden** is director of regions.

**Mechanical Handling Systems** — **Leonard Schmitz** has been appointed chief engineer.

**Parker Appliance Co.** — **John N. Wolfram** was promoted to administrative engineer.

**Kropp Forge Co.**—**Robert L. Clark** is now director of purchases.

**International Nickel Co.**—**John A. Marsh**, assistant vice-president and manager of operating department, has been elected vice-president.

**Joseph T. Ryerson & Son, Inc.**—**Harold B. Ressler**, chairman of the executive committee, has retired after 48 years service. He remains a director.

**Bardwell & McAllister, Inc.**—**Cecil Bardwell**, vice-president and a director, is now general manager.

**Lincoln-Mercury Div.** — **T. Jack Henry** was appointed advertising manager.



**Kaiser - Fraser Sales Corp.**—**John W. Raisbeck** has joined the firm as assistant general sales manager.



**Ohio Crankshaft Co.** — **M. J. Hoke** was named general manager of the crankshaft and camshaft division.



**Dodge Div.**—Promotion of **Paul M. Ruef** to the executive sales staff has been announced.



**Bendix Products Div., Bendix Aviation Corp.** — **George E. Beringer** is now general factory manager of the aircraft section.



**Rochester Products Div., GMC** — **F. D. Lowell** has been promoted to sales manager.



**Budd Co.** — **Ernest Brower** has been made manager of truck, bus and trailer wheel sales.

**Dunlap and Associates, Inc.**—**H. E. Blank, Jr.**, formerly editor of *Modern Industry* magazine and onetime assistant editor of *Automotive Industries*, was elected a vice-president.

**Vanadium Corp.** — **Frederick F. Franklin** is now manager of transportation development.



**Dodge Div.** — **C. J. Jefferson** has been appointed to the new position of training coordinator.

## Necrology

**Dr. Theodore Whittelsey, Sr.**, 85, former director of the central research laboratory of U. S. Rubber Co., died June 26 at Philadelphia.

**Jean Andreau**, 56, French designer of the body for G.E.T. Eyston's Thunderbolt racing car, died June 26 at Paris.

**Victor W. Peterson**, 61, chairman of Hannifin Corp., died July 1 on his Indiana farm.

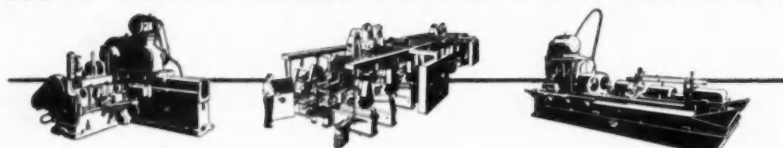
**Col. A. M. Chase**, 78, retired ordnance engineer and founder of the Chase Motor Truck Co., died at Hamilton, N. Y., on July 5.

**Earl Wallace Winans**, 72, industry pioneer and retired chief engineer of Federal Motor Truck Div. of Federal Fawick Corp., died at Wheatly, Ont., on July 4.

**Dr. Richard von Mises**, 70, early authority on powered flight and professor emeritus of aerodynamics at Harvard University, died July 14 at Boston, Mass.

# *Specialized* Manufacturing Facilities

**AT W. F. & JOHN BARNES . . . GEARED TO PROVIDE  
A BROAD 6-POINT MACHINE TOOL BUILDING SERVICE**



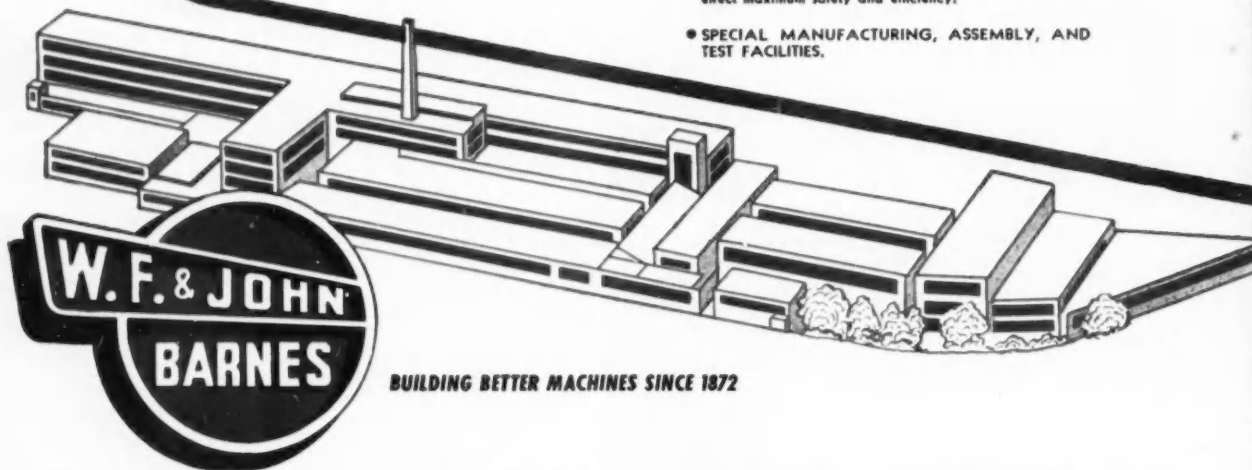
● One of the best equipped plants in the Midwest, W. F. & John Barnes is geared to provide an unusually broad machine tool building service. Machining, fabricating, and assembly departments for tools, gauges, fixtures, hydraulic, electrical, and conveyor equipment are centralized, and work is coordinated in one plant with planning,

designing, and engineering. With these complete facilities, Barnes is in position to help you solve problems quickly and efficiently. The complete, coordinated service with undivided responsibility includes:

- **COORDINATED DESIGN AND ENGINEERING** — Mechanical, Hydraulic, Electrical, Process, Tool, and Fixture Engineers work together at Barnes. Teamwork solves complex problems quickly.
- **SPECIAL HYDRAULIC EQUIPMENT** — designed and built to meet JIC standards. Individually engineered units assure smooth, dependable actuation for every requirement.
- **SPECIAL GAUGES, FIXTURES, TOOLS** — designed for each individual machining problem, assure accuracy of operations at high production speeds.
- **SPECIAL ELECTRICAL EQUIPMENT AND CONTROLS** — individually designed and built for maximum safety and ease of control with circuits that assure the most dependable coordination of all machine functions.
- **SPECIAL HANDLING AND CONVEYOR EQUIPMENT** — designed and built to reduce work handling, effect maximum safety and efficiency.
- **SPECIAL MANUFACTURING, ASSEMBLY, AND TEST FACILITIES.**

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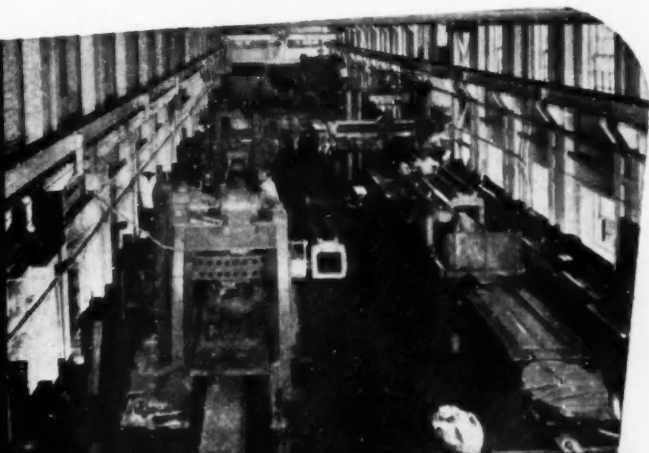
Ask for free booklet "Coordinated Machine Engineering" describing the scope of Barnes machine tool building service. Illustrates and describes modern machines and mass production techniques.



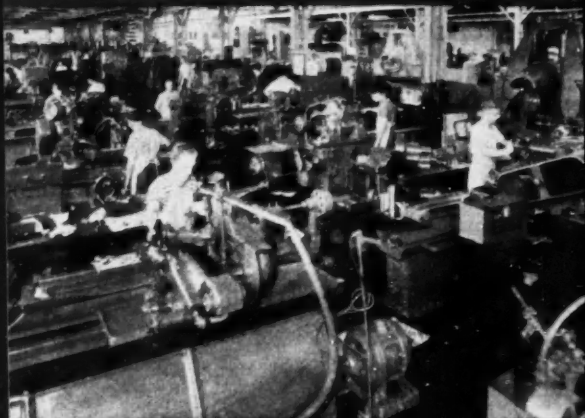
**MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES**



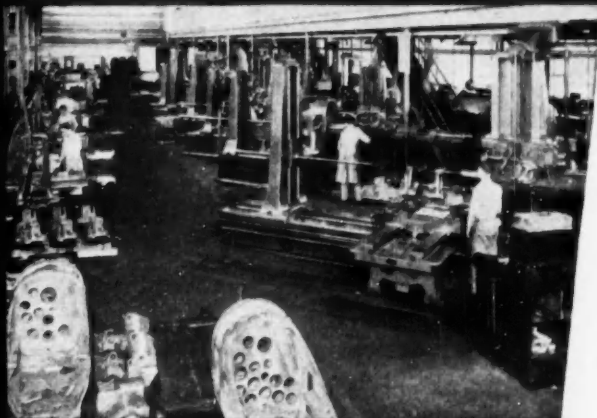
Production line—new and old cars of various makes of big, medium and small cars.



Large lathe—turning wheels and other parts for various makes of automobiles and trucks—up to 30 feet in length.



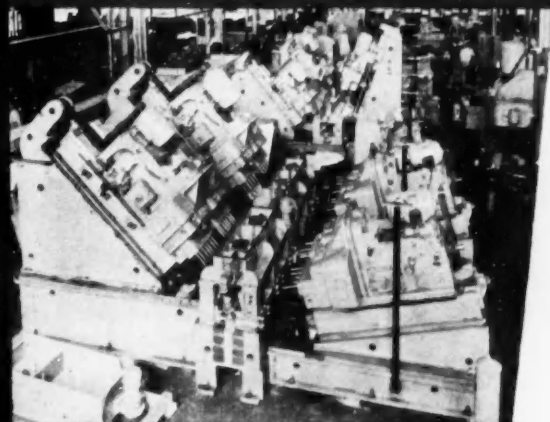
Production line—A wide variety of both small and large machines for turning and grinding parts by the finished product.



Machine turning wheels—usually turn bearing caps in steel and aluminum—make other metal parts for various makes.



Motor and engine assembly—valves, gears, bearings and other components are fitted by experienced mechanics.



Steel assembly—partial view of large lathe—usually turn wheels and other parts for various makes.

**W. F. & JOHN BARNES COMPANY 312 S. Water St. Rockford, Illinois**

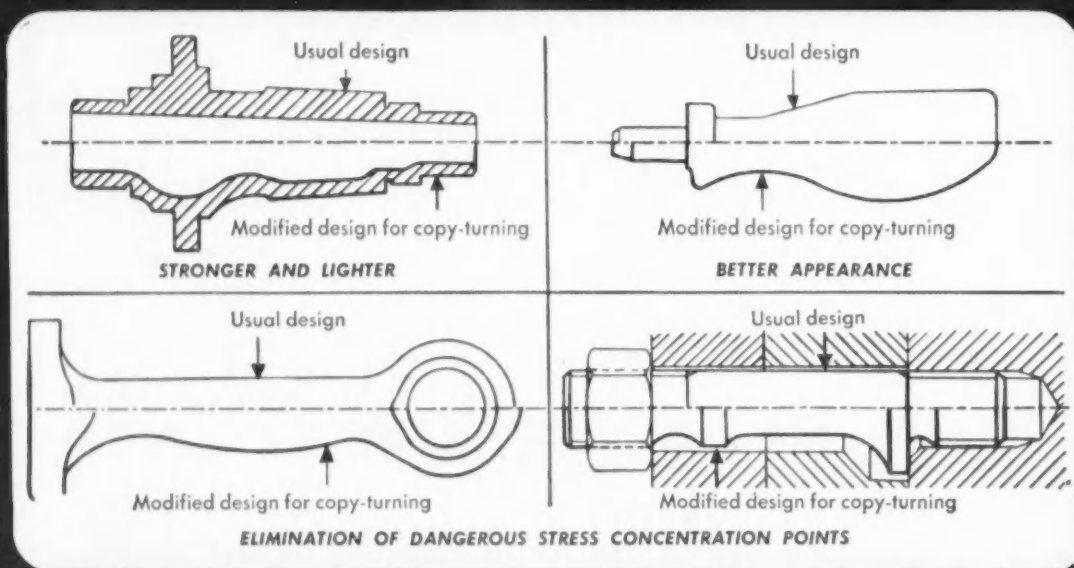
*AUTOMOTIVE INDUSTRIES, August 1, 1953*



Now you can O.K. designs like these if you have a . . .

# NEW BRITAIN

## +GF+ Copying Lathe

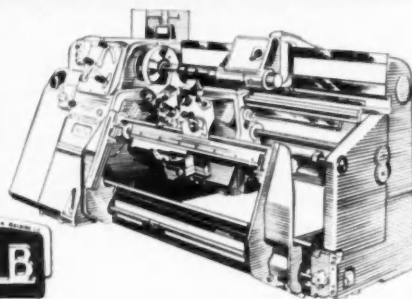


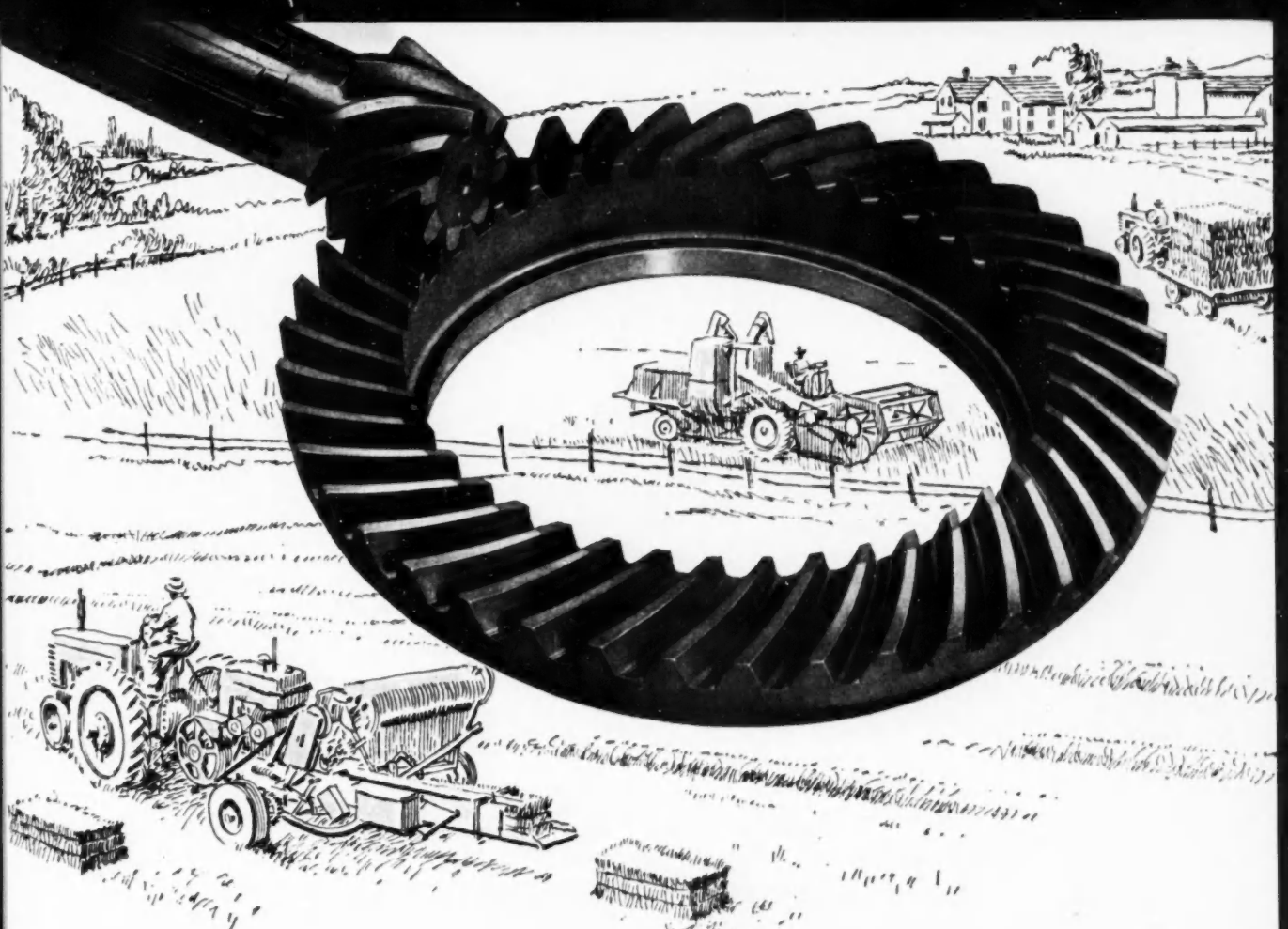
*The ideal profile need not be sacrificed because of production limitations*

**THE NEW BRITAIN MACHINE COMPANY**  
New Britain-Gridley Machine Division, New Britain, Connecticut

**NEW BRITAIN**  
*Automatics*

**Machines for Making Progress**  
Automatic Bar and Chucking Machines  
Precision Boring Machines  
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## AGRICULTURE—geared to modern production standards

A self-propelled combine, handled by one man, will work rings around the old-fashioned threshing crews of a few years ago. And a modern hay-baler does in a few hours, at a single operation, the tedious work that required days of work not long ago. That's modern production—just as efficient—just as important to the nation's good—as the miracles of America's great industries.

We're particularly aware of this development because "Double Diamond" Gears have grown up with the flourishing farm machinery business. For years "Double Diamonds" have been transmitting power in all kinds of mechanized farm equipment. As the machines grew bigger—as demands of them became more critical—"Double Diamond" Gears have grown in

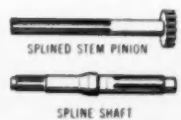
demand. They must stand unusual abuse—long periods of idleness followed by around-the-clock service months on end—and must deliver dependable performance at points many miles from service centers. The fact that "Double Diamonds" have met these requirements, and for so many years, makes them a name to bear in mind when your needs call for gears of that character.



# AUTOMOTIVE GEAR WORKS

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FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS



Reg. U. S. Pat. Off.

# Lifting Aviation's Glass Fiber

The increasing speeds attained by jet aircraft, guided missiles, and rockets develop high surface temperatures that are a growing problem to the aviation engineer. Some conventional structural materials lose much of their mechanical strength with continued exposure to such heat.

Among the newer materials developed to lift the "heat barrier" are glass fiber-phenolic plastic laminates bonded with BAKELITE Phenolic Resin BV-11946. They have a high strength-weight ratio. They retain a high percentage of initial strength properties up to 500 deg. F. for periods up to and exceeding 30 minutes. They have low heat-transfer properties, and their coefficient of expansion is lower than that of comparable metal structures. They resist corrosion by sea water, fuels, hydraulic fluids, lubricating oils, and air at high temperatures.

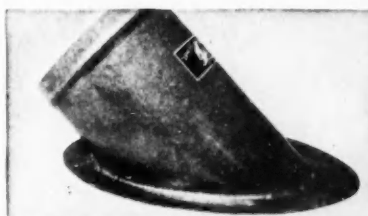
Parts made of these phenolic resin laminates are produced with a minimum of tools, jigs, and fixtures, saving costly floor space. Designing such reinforced plastic structures can also result in man-hour savings in both tooling and production operations.

Moldable at pressures as low as 10-50 psi, glass fiber-phenolic resin laminates can be cured in minutes when matched metal molds are used. Rubber bag or diaphragm molding are also practicable. They can be handled in dry form and laid up in a mold in much less time than the conventional wet lay-up system requires.

For more information on the use of glass fiber laminates made with BAKELITE Phenolic Resin BV-11946, write Dept. RC-59, presenting your requirements. Bakelite Company engineers are available to assist in evaluating and working out your plans.

# "Heat Barrier"...

## Phenolic Plastic Laminates



Exhaust duct made by using break-away plaster mold



Air intake for aircraft, made with a matched metal mold



Fairing made on male mold, rubber bag method, vacuum pressure



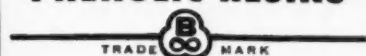
Channel and I-beam molded by rubber bag method



Hot air duct, formed by wrapping impregnated glass cloth over split mandrel, covering with cellophane, and curing for one hour at 300 deg. F.

Photographs courtesy of Zenith Plastics Company, Gardena, Cal. and Bassons Industries, Bronx, New York.

**BAKELITE**  
TRADE-MARK  
**PHENOLIC RESINS**



**BAKELITE COMPANY**

A Division of  
**Union Carbide and Carbon Corporation**  
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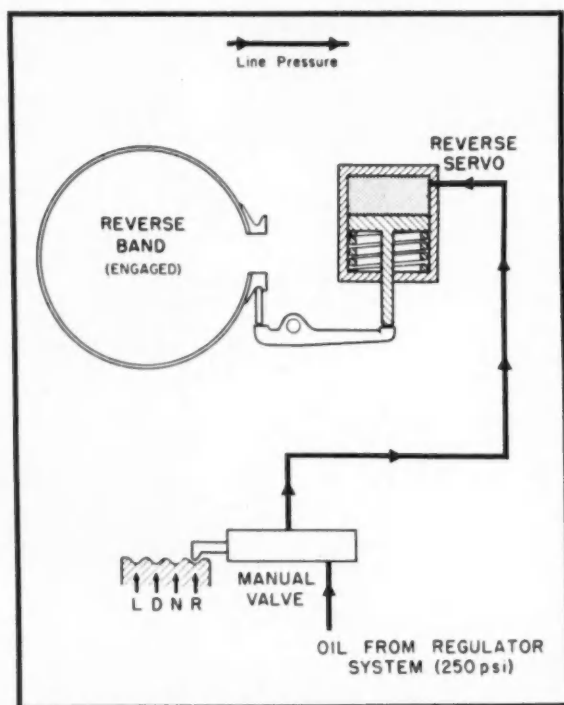
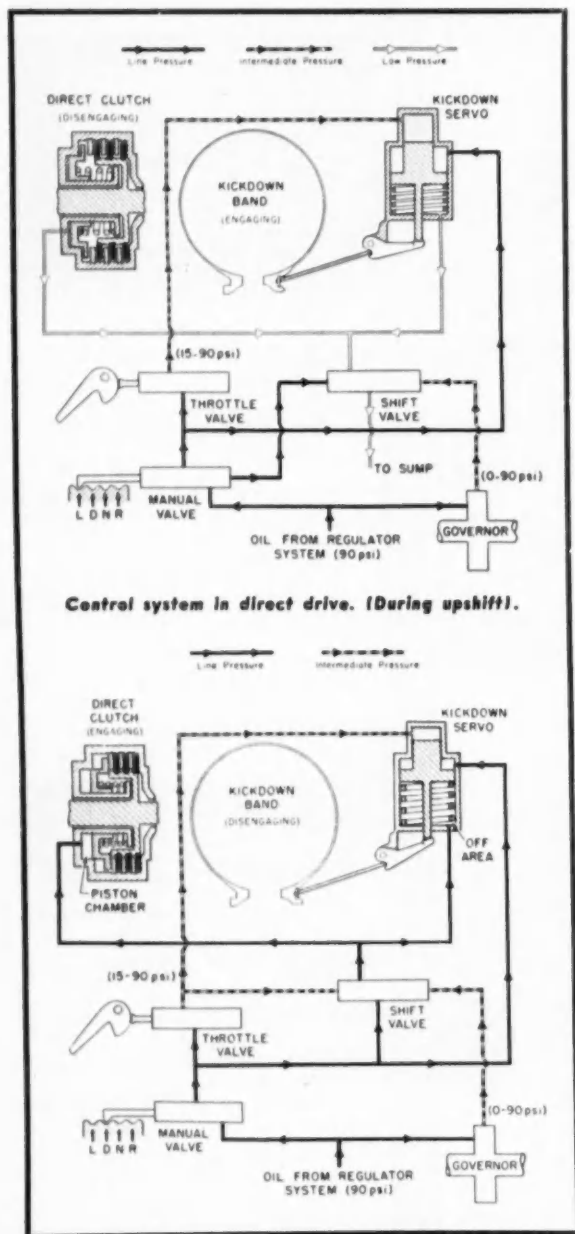


# New Chrysler Transmission

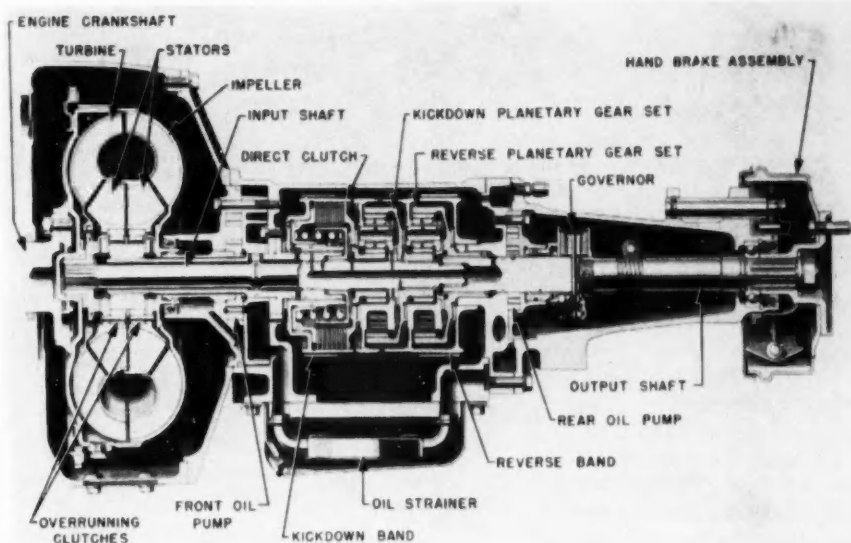
## Has High-Ratio Torque Converter

Light Weight and Small Number of Parts Are Among the Features of the PowerFlite Fully-Automatic Unit

**I**NTRODUCTION of PowerFlite by Chrysler Corp. presents a fully automatic transmission for Chrysler Div. cars, combining a high performance torque converter and a simple, two-speed planetary gearbox. The conventional clutch pedal and clutch have been eliminated, thus making it possible to achieve full range performance without removing the foot from the accelerator pedal.



By  
Joseph Geschelin



**Complete PowerFlite assembly.**

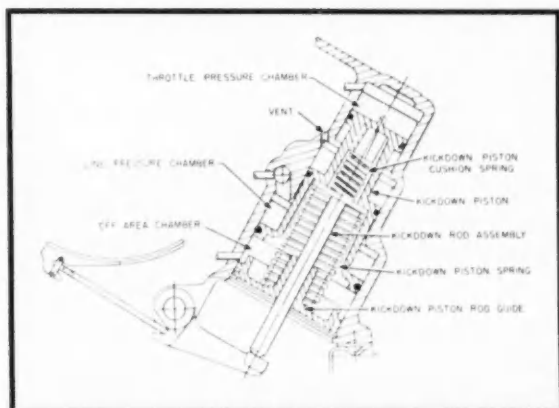
PowerFlite has two driving ranges—"Drive" for all normal operations; and "Low" for unusual driving conditions such as climbing or descending mountainous roads. Starts in Drive range accelerate the car in low gear with the aid of the torque converter, shifting smoothly into direct drive at the proper time. This is a fully automatic power shift. The drive also provides a kick-down feature (by depressing the pedal to floor board) if additional acceleration is required while in direct drive to assure quick, safe passing.

Starting torque ratio of the new torque converter is 2.6 to 1, said to be the highest in the industry. When combined with the low gear ratio of 1.72 to 1, the resulting overall torque multiplication at breakaway is 4.47 to 1. Chrysler claims that the new drive has the lowest weight and smallest number of parts to be found in any current automatic drive.

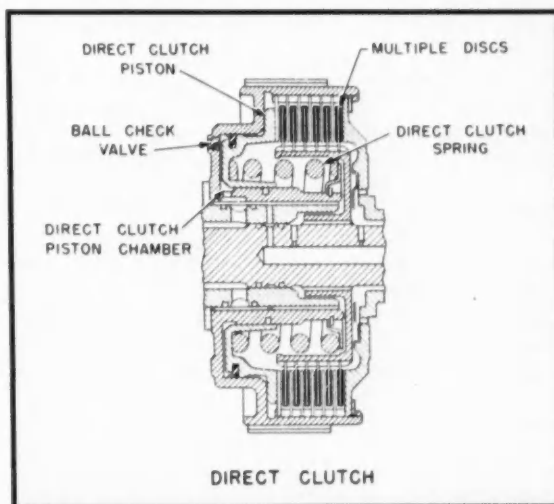
PowerFlite has some features of general interest

from the standpoint of the driver. First of these is selector lever operation which is simplified by means of a gated movement. Reverse is adjacent to Neutral at the left side; while Drive and Low are on the right. Gating of selector lever operation makes it necessary to lift the lever toward the driver to engage either Reverse on the left or Low on the extreme right. This arrangement makes it possible to select the desired positions by feel without the need for watching the indicator pointer.

One of the mechanical simplifications of this drive stems from the elimination of a built-in parking lock with its sprag mechanism. For parking, Chrysler continues to rely on its time-tried powerful expanding hand brake on the propeller shaft. (*Turn, please*)



**Kickdown servo which actuates the front band.**



**Longitudinal sectional view of the direct clutch.**

Since the selector lever is interlocked with the starter circuit, the driver must place the transmission in neutral before the engine can be started. If the need arises, a PowerFlite-equipped car can be started by pushing, holding the transmission in neutral until a speed of about 25 mph has been attained, then shifting into Low.

The new torque converter consists of four elements: an impeller, a turbine and two stators. Both the impeller and turbine are hydrogen-brazed assemblies of stamped parts; while the stators are precision aluminum castings. The unit is serviced as a complete assembly since the two halves of the torque converter shell are welded together. The torque converter housing is made of die-cast aluminum alloy. It is of interest that the mechanism is cooled by means of a water-cooled heat exchanger.

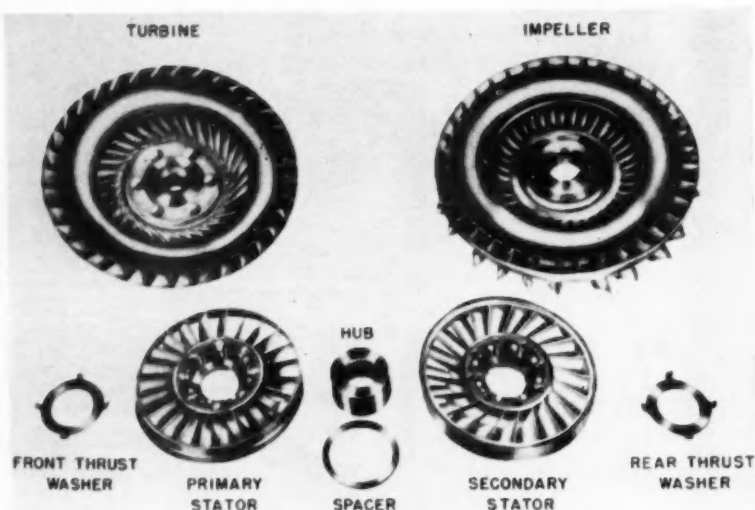
Although impeller vanes are straight and radial to assist in gaining the desired torque multiplication and stall speed, the turbine and stator blades are curved for maximum efficiency, stator blades in addition being of airfoil section.

Each stator is mounted on an overrunning clutch, consisting of eight spring-loaded rollers mounted within an internal cam around the periphery of the hub. Since the hub is held stationary by the stator reaction shaft, which is bolted to the transmission case, each overrunning clutch prevents its stator from moving in a direction opposed to turbine and impeller rotation, but allows it to rotate freely with turbine and impeller.

The basic gearbox contains two planetary gear sets, two bands, one multiple disk clutch, and a control system composed of nine control valves. Wherever practical aluminum or magnesium parts are used. These include: the extension housing, control valve body assembly, output shaft support, and rear pump housing. The aluminum valve body is anodized to improve the wearing qualities of bearing surfaces.

The lube oil system of the assembly holds 12 qt of automatic transmission oil Type A with change intervals at 20,000 miles. Oil pressure for the combined oil system is furnished by either the front or rear gear pump, depending on car speed. Part of the oil is fed to the control system, part is circulated through the torque converter, oil cooler, and transmission lubrication system.

Oil enters the torque converter assembly through an annular hole at the rear side of the overrunning clutch and leaves through a similar hose at the front side. It then proceeds through tubing to the oil cooler



Components of the hydraulic torque converter.

at the forward end of the engine. Cooling water is drawn from the radiator and returns to the engine water pump.

Upon leaving the oil cooler, oil is fed to the gear box. From the return line, oil is fed to a large hole through the center of the front end of the output shaft and back end of input shaft. Small holes in the input shaft direct oil to all parts of the direct clutch and planetary gear sets requiring lubrication. Oil slingers are provided to assure full lubrication of planet gear needle bearings.

The two planetary gear sets constitute the heart of the gearbox. Each one consists of three members: an annulus or ring gear, a planet pinion carrier containing three pinion gears, and a sun gear. Planet gears are freely mounted on shafts fixed in the carrier and in constant engagement with both sun gear and ring gear.

Both front and rear transmission bands as well as the multiple disk direct clutch are actuated by hydraulic means. The direct clutch is applied by admitting oil under pressure into the piston chamber. It is released by action of its spring when oil pressure is removed. A ball check valve is incorporated in the clutch piston chamber to vent any oil remaining when the clutch is disengaged, thus preventing possibility of clutch drag. Centrifugal force unseats the ball when there is no oil pressure.

Front and rear bands are engaged or disengaged by action of the kickdown and reverse servos, respectively. The kickdown servo applies the front band through a mechanical linkage when the kickdown rod assembly is forced down by oil pressure in both throttle and line pressure chambers. Smooth engagement of the kickdown piston when shifting from neutral to either Low or Drive is assured by the action of the cushion spring.

The reverse servo also is actuated hydraulically by

(Turn to page 134, please)

# Transport Vehicles of Czechoslovakia

By David Scott

**S**TANDARDIZATION of parts and a narrow range of end-products is the guiding principle behind the drive for production in the Communist countries, and Czechoslovak commercial vehicles embody this to a high degree. Production is now concentrated on five models; one heavy 6 x 6 and two truck-bus pairs.

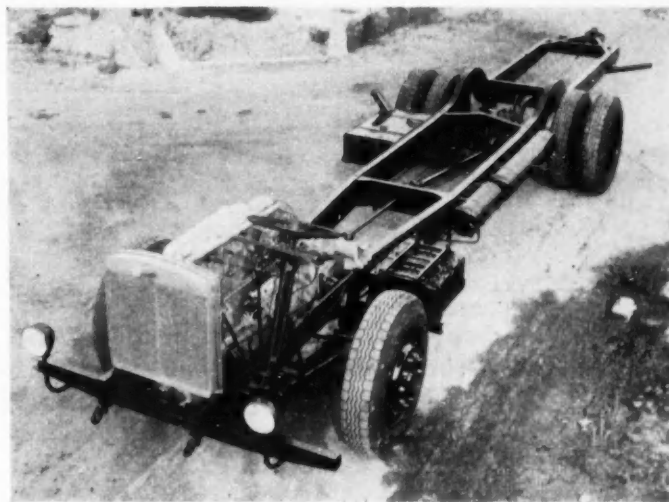
The unusual constructional feature of the 10 ton Tatra 111 is the frameless chassis. One central member, a steel tube of some eight in. diameter, houses the drive shaft and connects the differentials with the gear box, while the engine is mounted on the front differential.

All six half axles are connected through universal joints to their respective differentials, braced with tie-rods, and independently sprung. A pair of obliquely-mounted quarter-elliptical springs suspend the front wheels while the rear

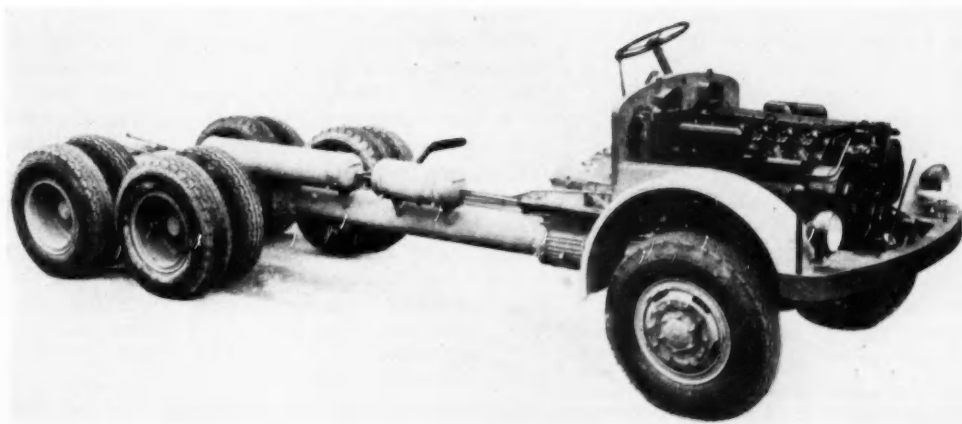
*(Turn to page 122, please)*



Model 706 R Skoda with three-way dump body and hydraulic lift.

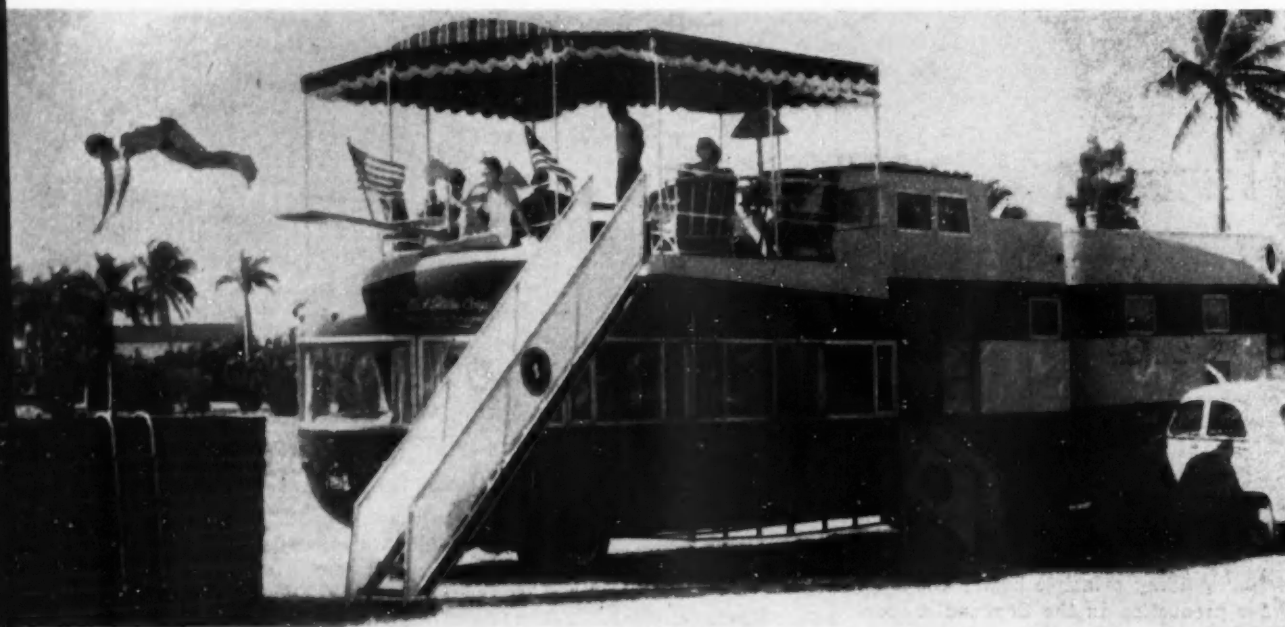


Skoda 706 RO bus chassis with steering and other controls located at the left of the engine.



Chassis of the Tatra 111. All wheels of this 6 x 6 are independently sprung. No conventional frame is required.





## *Trailer Coach Industry Becomes*

**Scarcely Known Two Decades Ago, the Billion-Dollar Trailer Coach Industry Has Become a Large Automotive Operation, Often Served by the Same Suppliers. About 740,000 of these Mobile Homes Are Now Occupied by Nearly Two Million Persons and Hundreds Each Week are Rolling Off Assembly Lines**

**By Andrew W. Shearer**

**T**HE Conestoga wagon, the first mobile home used in the U. S., has long since faded into history, along with the leathery plainsmen who inched their way across the dusty stretches of a virgin land with only a flapping bit of canvas between themselves and the heavens. These primitive prairie schooners have been replaced by the modern trailer coach, whose occupants roll across the broad highways of America with an ease and luxury that far exceed the wildest dreams of Kit Carson and Buffalo Bill.

Over 1,850,000 Americans now call more than 740,000 trailer coaches "home," and their numbers are increasing at the rate of 175,000 persons a year. If all of these "trailerites," as they proudly call themselves, were grouped together in one spot, they would comprise the nation's sixth largest city, just behind Detroit and ahead of Baltimore. It is estimated that

by late summer of this year the total of trailer dwellers will have swelled to proportions of 2,000,000.

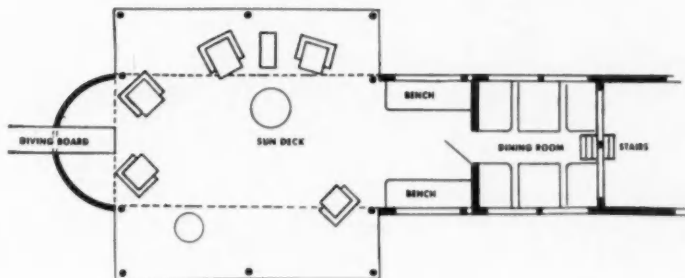
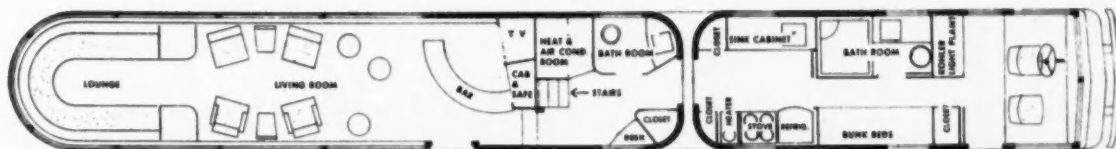
The trailer business is a comparatively young one, for 25 or so years ago it was practically non-existent. Now and then a custom builder put together a trailer for a vacationing sportsman or a traveling businessman, but there was no real industry as such. Today, trailer manufacturing and servicing, plus the operation of trailer parks, puts the industry in the billion-dollar bracket.

The story of the phenomenal growth of the industry is told by the following trailer coach retail sales:

1930	\$1,300,000	1946	\$114,000,000	1950	\$216,000,000
1937	17,000,000	1947	146,000,000	1951	248,281,684
1939	10,000,000	1948	204,000,000	1952	319,917,900
1945	39,000,000	1949	122,000,000		

Source: TCMA

Unitwise, sales of mobile homes increased from



EXECUTIVE FLAGSHIP

Unique in the annals of mobile home construction is the "Executive Flagship" built by Mid-States Corp. Sixty-five ft long, two stories high, and nine ft wide for traveling, it weighs 18 tons. When this Colossus is parked, the top deck opens out as shown to make it 16 ft wide. Designed to provide both living quarters and office space for traveling executives, it is built in two sections and is powered by a 128-hp International truck engine situated in a 24-ft forward cab unit. Price tag, complete with portable swimming pool, is \$75,000.

## BIG BUSINESS

67,335 during 1951 to 83,054 in 1952. By way of additional comparison, the latest available figures for the first quarter of 1953 show that unit sales totaled 19,095, against 18,372 in the comparable 1952 period. This total represented a dollar volume of \$73,515,750, an increase of 3.9 per cent from the \$70,732,200 volume in the first 1952 quarter.

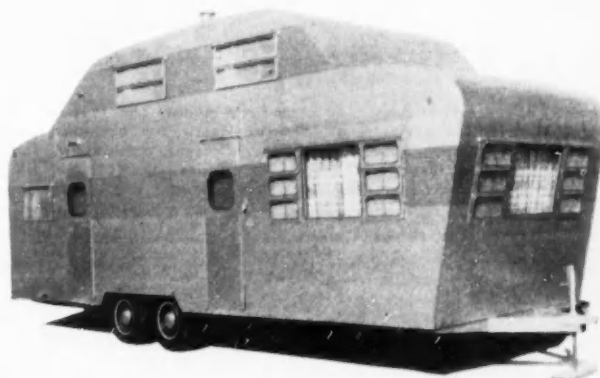
### Industry Organization

The trailer coach industry, as presently constituted, is made up of more than 150 manufacturers whose wares are sold by over 3000 dealers throughout the country. None of the manufacturers produces more than 10 per cent of the industry's output. Some of the larger makers may turn out over 100 trailers a week, while the smaller ones may build perhaps only two or three. The price of the average trailer sold today is in the \$3000 to \$6000 category, and manufacturers' profits are said to run from eight to 12 per cent.

Although the majority of trailer coaches are manufactured in the Middle West at plants located mainly in Illinois, Michigan, Indiana, Ohio, and Wisconsin, a sizable industry is springing up also in the West (Denver and beyond). It is estimated that in 1952, for example, this section of the country accounted for about one-fifth of total industry produc-

tion. Of this West region total, California produced about 65 per cent, or 13 per cent of the national dollar volume of \$319 million. Thus, California had a production of about \$41 million for 1952.

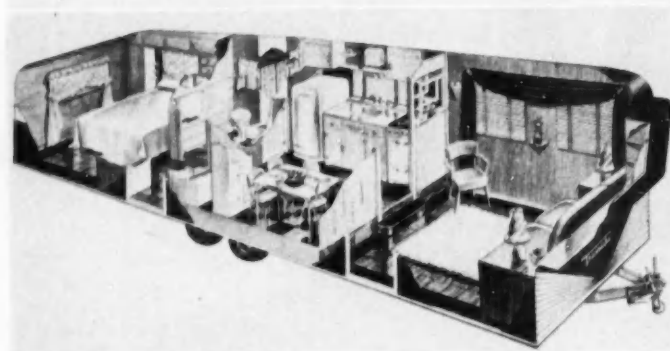
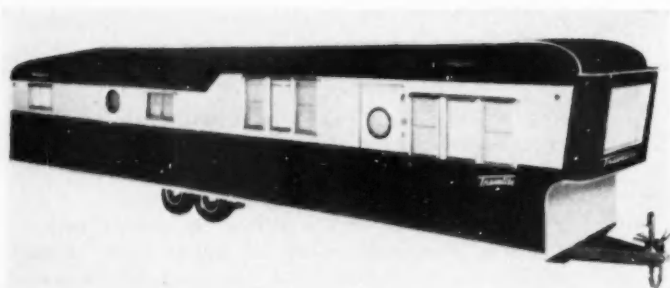
Fully conscious of the axiom "in union there is strength," the house trailer industry is solidly welded together in the Trailer Coach Manufacturers Association (TCMA) and the Trailer Dealers National Association (TDNA); later this year the names of the two organizations will be changed to Mobile Homes Manufacturers Association and Mobile Homes National Association, respectively. The former is composed of trailer coach manufacturers and suppliers of material,



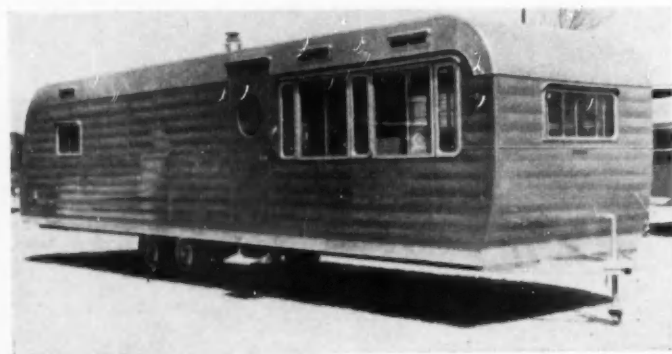
One answer to the demand for more trailer living space has been provided by Lighthouse Trailer Co. with the introduction of this Duplex model. Standing 11½ ft high, but only 28 ft long, the spacious coach has two bedrooms and wardrobe chests on the second story, in addition to the usual facilities on the first floor.



Residents of Squaw-Peak Terrace Trailer Park, near Phoenix, Ariz., can enjoy a dip in the inviting pool and a view of the mountains at the same time. The attractive trailer colony has 39 spaces which rent for only \$25 a month.



Typical of the larger mobile homes on the market today is the Travelite Model 641-RF Homette with a length of 41 ft. Exterior walls are of aircraft aluminum with fibreglas insulation. Cutaway view shows the layout of the home-size rooms with complete kitchen, dinette, and bathroom. The unit is available in a two-bedroom model also.



parts, or accessories, while the latter represents their dealers. The Western segment of the industry also has its regional trade association, known as the Trailer Coach Association (TCA), with headquarters in Los Angeles, Calif. Unlike TCMA, it includes dealers and park operators among its members, in addition to manufacturers.

TCMA employs a sizable full-time staff which continually works at promoting the best interests of the industry and its customers. Its multi-faceted program includes a number of diverse activities. Included among them is a trailer park improvement and development service. Prospective or current operators are given help and suggestions in designing, building, and running trailer parks, work is carried on with Government officials in promulgating suggested booklets on trailer park construction, and trailer parks across the country are inspected and graded; the TCMA Gold Star for excellence is an award coveted by park operators.

Public relations and advertising work is also a major part of the TCMA pro-

Parked, but ready to roll on a few minutes notice if need be, this streamlined Anderson trailer coach measures 35½ ft in length and weighs 6200 lb. A versatile medium-size unit, it has three available bedroom arrangements. Adequate ventilation is provided by vents near roof as well as by windows.



*Boat docks are among the many facilities offered at Parsley's Trailer Park, near St. Petersburg, Fla. Other attractions right in the park include a private beach and sun-deck, wash house, shuffleboard courts, supermarket and shopping center, and two community halls. A private bath and tiled shower accompany 144 out of a total of 223 spaces, and the other 79 have direct sewer connections. Rates run from \$18 a month up, depending upon the type of accommodations furnished.*

gram. It is not aimed at selling trailers, but rather towards winning a friendly public acceptance of mobile homes, their occupants, and trailer parks.

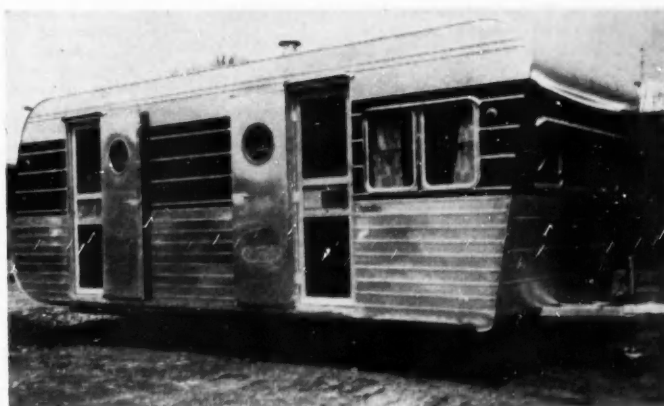
There was a time when trailer folk were looked upon as a rather peculiar brand of gypsy, but communities have been well educated to realize that trail-erites are good, solid citizens who can and are willing to contribute a great deal to the community welfare. Public acceptance has, of course, been immensely aided also by TCMA's constant efforts to see that trailer parks are additions to the landscape, and not eyesores.

Other phases of TCMA's far-flung activities include work with financial institutions to improve conditions for trailer financing, certain legislative functions, and the sponsoring of trade shows. Thus, although the trailer industry is a highly competitive one, it is closely knit together through TCMA in an active program for the common good.

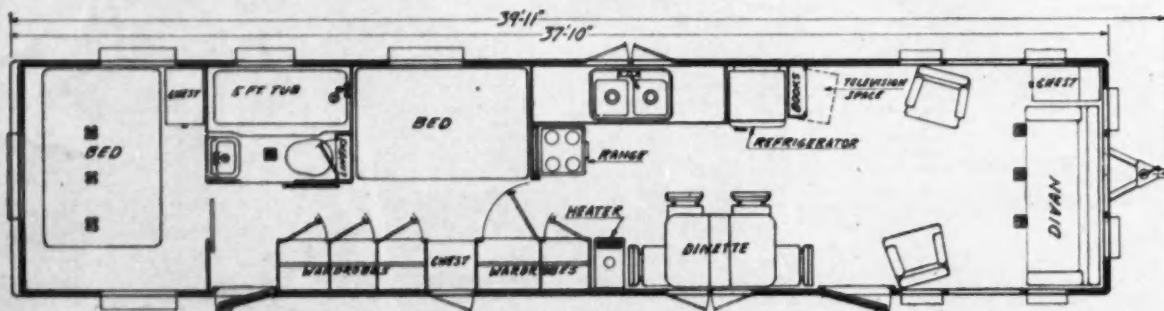
### **The Trailer Market**

What manner of people make up the trailer market? This question is more

*One of the newest designs in the small trailer class is represented by the 22-ft National coach on the right. Compact arrangement of its kitchen equipment above demonstrates a cardinal precept in the design and construction of any mobile home—the practical utilization of every inch of space within what are of necessity small confines.*







Behind this finished floor plan for an ABC Model 406 coach lie many hours of careful thought and planning to incorporate all the facilities necessary to comfortable living in only 37 ft. 10 in. of length. The fruits of drafting board efforts are apparent in an uncluttered layout that even allows for a television set.

complex than it appears on the surface, for it is almost as difficult to find a common denominator among the various motives which prompt people to buy a trailer as it is to find one among the individuals themselves with their varying circumstances and interests.

Contrary to popular belief, the desire to travel is not such a prime factor in trailer purchases today as it used to be. As a matter of fact, about 45 per cent of the people now living in trailers use them as permanent or semi-permanent housing and seldom move with them. The fact that about 39 per cent of all people living in trailers have children may be a contributing cause to this situation.

The industry itself has taken cognizance of the increasing trend toward the use of trailers as housing, rather than as mere rolling shelters. While it is pointed out that the mobility is there when wanted, the keynote of the trailer sales pitch has swung more and more to the home angle, with such features as the economical way of life and the simplicity of house-keeping stressed more and more. Mobility is, to be sure, very important because it is the feature which distinguishes the trailer from a house or apartment more than any other, but there are many other points of appeal that are prompting scores of people every day to follow the trailer way of life.

## AUTOMOTIVE SUPPLIERS SERVING THE TRAILER COACH INDUSTRY

(Associate Members of the Trailer Coach Manufacturers Association)

COMPANY	PRODUCTS
Aladdin Specialty Co.	Directional signals, electrical equipment, plumbing supplies
American Steel Foundries	Axle and spring assemblies
Armstrong Cork Co.	Caulking compounds, floor covering, insulating material
Armstrong Rubber Co.	Tires
Atwood Vacuum Machine Co.	Auxiliary wheel units, couplers, jacks, steps
Bargman, Theodore	Body and other hardware, directional signals, electrical and plumbing equipment.
Dayton Rubber Co.	Tires
Elkhart Tool & Die, Inc.	Hardware, molding, steps
Fayette Manufacturing Co.	Axles, brakes, drums, hubs, hub caps, wheels
Foreman Manufacturing Co.	Axles, chassis frames, draw bar hitches, drums, hubs, hub caps, running gear, springs, wheels
Goodrich, B. F., Co.	Rubber products, tires, tubes, upholstery, wall coverings
Harrison Sheet Steel Co.	Cabinets, chassis frame parts
Hart Metal Products Corp.	Body sections, chassis frames, doors, molding
Hub Industries	Electrical Equipment
Kelsey-Hayes Wheel Co.	Drums, electric brakes, hubs, hub caps, wheels
Liggett Spring & Axle Co.	Axles, brakes, chassis frames, drums, hubs, hub caps, running gear, springs, wheels
Meier Products Corp.	Molding, windows
Motor Wheel Corp. (Duo-Therm Div.)	Space heaters
Pennsylvania Rubber Co.	Tires
Reynolds Metals Co.	Aluminum sheets
Sterling Bolt Co.	Bolts, nuts, screws, rivets, washers, and other fasteners
Stromberg Hydraulic Brake and Coupling Co.	Hydraulic brakes
Tuthill Spring Co.	Springs
Warner Electric Brake & Clutch Co.	Electric brakes

This sequence of photos shows a few of the steps followed in the assembly of a trailer coach at the Redman Trailer Co. plant in Alma, Mich. A. Side construction is taken from the jig to be assembled on the frame; B. Complete set of sides after being secured to the main floor; C. A completely insulated coach is shown before waterproof barrier paper and aluminum paneling are installed; D. Roof is secured to main body.

The trailer population can be broken down into the following general categories, in the order of their numbers and rank in industry sales:

1. Mobile or semi-mobile occupation workers.
2. Military personnel.
3. Retired people.
4. Miscellaneous.

Included in the first group, which presently accounts for approximately 60 per cent of industry sales, are workers in defense and allied industries, traveling salesmen, and independent migratory businessmen who have outfitted their trailers for special purposes, such as beauty parlors, small machine shops, bookstores, etc.

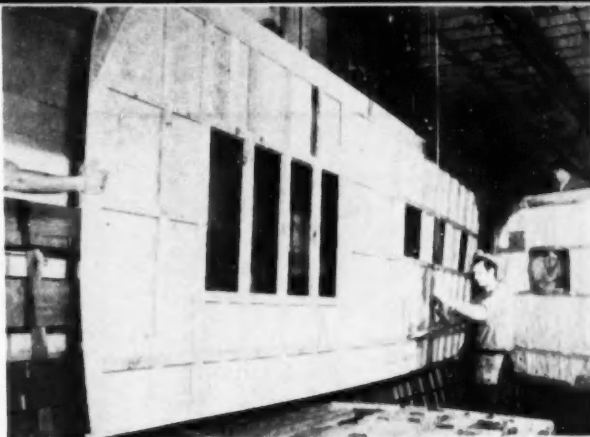
The growing importance of trailer coaches as mobile housing, rather than as mere transportation, was amply demonstrated during World War II when the Government alone purchased 38,000 trailers for use as emergency housing in war plant areas. Mobile homes are still playing an important role in national defense, and it is estimated, for example, that as many as 10,000 trailers housed workers at peak occupancy on The Savannah River Atomic Energy Development Project near Aiken, S. C.

Servicemen and their families now constitute the second largest trailer market (about 25 per cent of current sales) because mobile housing means immediate housing well within their means. His wife and children can accompany the man in uniform wherever he goes in the U. S., and they do not fall prey to landlords who charge high prices for poor accommodations. The Armed Forces themselves have recognized the value of trailers as housing for their personnel by building parking facilities for mobile homes owned by service personnel on or near a number of bases.

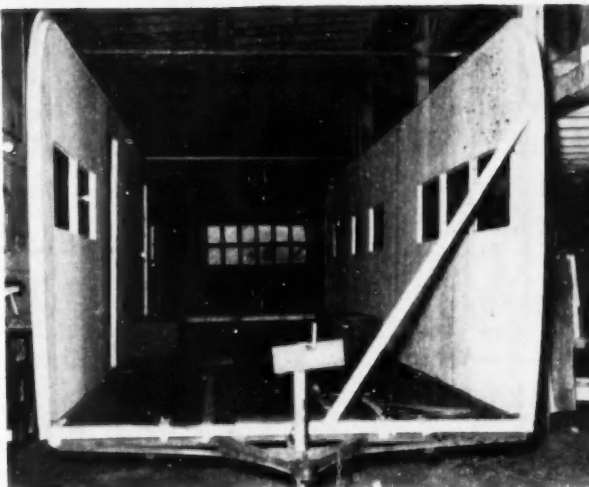
Retired people, the third largest group of trailer coach owners, now account for about 10 per cent of industry sales. It is estimated that there are now close to 200,000 of them living in trailers.

Aside from the fact that trailer living seems to simplify adjustment to retirement, economy, independence, flexibility, and the opportunity to seek more pleasant climates with the changes in seasons are powerful magnets that are drawing these elderly folk to trailers in increasing numbers each year. For the most part, they gravitate to trailer parks where there are other

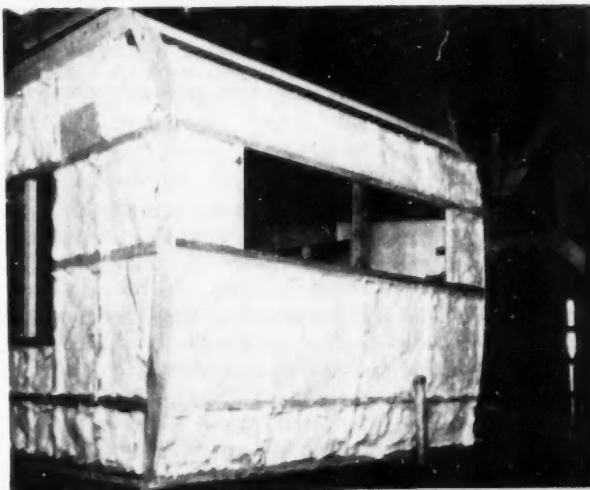
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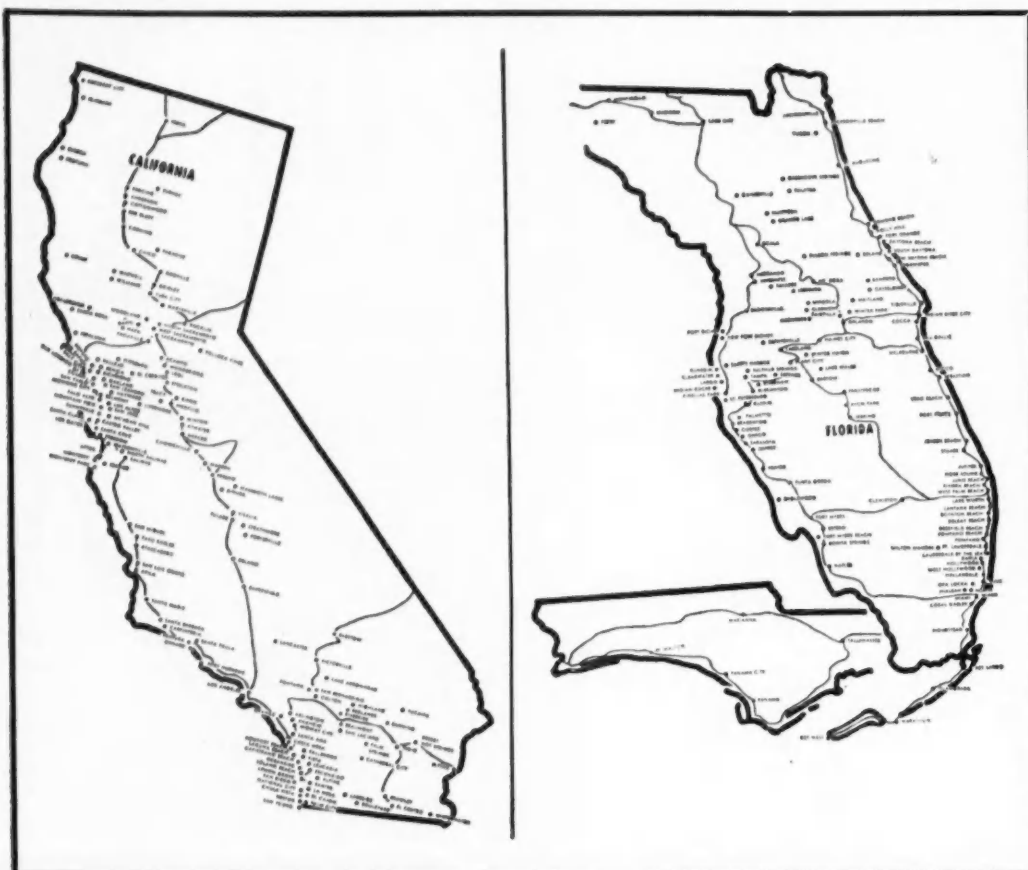


C



D





The heaviest concentrations of trailer parks in the U. S. are to be found in Florida and California. The mild climates of these two states, plus the large number of first-class parks, draw thousands of trailerites annually. All towns shown have approved trailer parks; stars indicate Gold Star approved parks.

retired people, since a congenial atmosphere among others of similar ages and interests can be anticipated.

The fourth miscellaneous group of trailer owners, about five per cent of the total, includes vacationers who use trailers only for pleasure trips, newlyweds who find the high cost of apartments or stationary houses far beyond their pocketbooks, and what is called the "trailer life group." This last class is made up of those who have no particular reason for living in a trailer coach other than that they naturally like the way of life.

#### Financing and Insurance

Although a trailer coach costs considerably less than a house, its purchase does represent a sizable financial undertaking for the average individual. A typical dealer sales establishment will offer a wide range of models, varying in price, size, and interior refinements. The selection may include a 40-ft model for \$5000 and up, 36-ft trailers from \$4300 to \$3500, 32-ft models ranging in price from \$4000 to \$3500, 26-ft units from \$3000 to \$2600, a 24-ft trailer for \$2400, and a 16-ft model for \$1600.

Since approximately 70 per cent of trailers bought in 1952 were over 30 ft in length with a price tag of \$4000 to \$5000, the demand for financing funds has been high. It is estimated that the amount of installment credit now outstanding on trailer coaches is in the neighborhood of \$300 million, and by 1955 it is likely that half a billion dollars will be required for the financing of mobile homes.

Funds for trailer financing are usually lent by banks and finance companies, rather than by dealers or the manufacturers themselves. Customary terms are a third down and three to five years on the balance. Interest rates vary, but most of them are five and six per cent. The average trailer financing contract is approximately \$2000.

In days gone by, banks and private institutions used to shy away from trailer financing because the very mobile nature of homes on wheels gave rise to fears of an excess of "skips." The fact that the majority of trailers are now sold primarily for housing, rather than for traveling, has helped greatly to dispel this previous reticence. Furthermore, the 1950 census showed that the average income of all trailer residents

The self-powered mobile dwelling pictured here was recently introduced by Howard Industries, Inc. Known as the "Safari", it has a GMC truck engine with Hydra-Matic drive, is built on a ¾-ton extended chassis, and has its own self-contained utilities. Included in its 22 ft of length are a kitchen, fold-in closet that opens into a shower, bathroom, sleeping room for five, dinette, rear terrace, and roof sun-deck.



was \$4500, compared with the national average of \$3313 for that year. These factors, coupled with the fact that the average trailer owner is a thoroughly responsible person, have served to put the loss ratio on trailer financing at less than 0.16 per cent.

Insurance is as necessary a form of protection for trailer coaches as it is for other types of vehicles. The average mobile home insurance policy covers fire, theft, and combined additional coverage. Owners who travel frequently with their coaches often purchase collision insurance, either \$50 or \$100 deductible, on an annual basis. In view of the more sedentary nature of today's trailer dweller, however, a large percentage of collision insurance is sold on an individual trip basis when the need arises.

### Design and Construction

The basic design of trailer coaches, which is fairly well standardized, includes a living-room, kitchenette, bedroom, and bath facilities. Larger models may incorporate two bedrooms or a bathtub in place of a shower. The living-room is usually in the forward section of the coach, while the bedroom is in the rear. Of course, there are many variations on this basic design to satisfy different tastes or requirements.

Trailer coaches, unlike stationary houses, come complete with furniture and interior adornments, such as window blinds and draperies. Included as standard equipment are a cooking stove, refrigerator, all plumbing fixtures, and a space heater. Among the "extras" which can and are being incorporated into mobile homes today are television, garbage disposal units, washing machines, radiant heating, air conditioning, fireplaces, and upstairs bedrooms.

The wealth of facilities to be found in a modern trailer coach, including water, sewage, and electrical connections for plugging in at trailer park sites, make today's mobile home seem like a mansion compared to the trailer of 20 years or so ago. At that time it

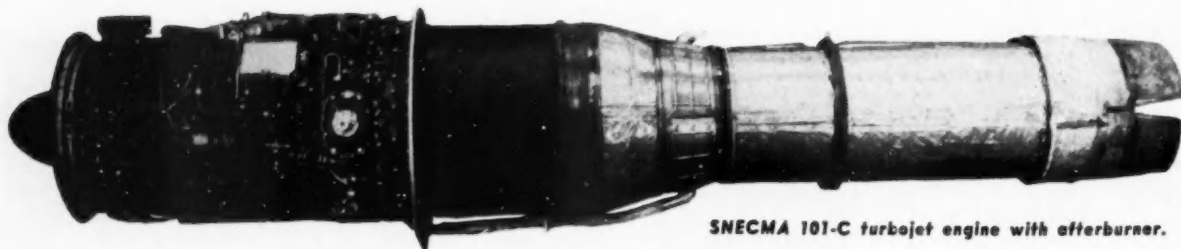
was usually no more than a rolling shanty with a couple of bunks inside and very few, if any, conveniences. The trailer home today, on the other hand, is richly finished with paneled woods, glistening kitchen and bathroom fixtures, and strikingly modern bathrooms. Greatly improved brakes and better weight distribution to eliminate much sidesway are but two of the many mechanical improvements made.

Since a good trailer incorporates all the features of a smart, though compact, apartment into a vehicle that will spend at least part of its life on the road, sturdy construction is essential. Prime requisites include: a strong chassis frame with approved coupler and safety chains; properly balanced running gear location, hitch weight, and interior arrangement to insure, with proper load distribution and at normal speeds, performance on the highway free of weave and sidesway; tires, axles, springs, wheels, hubs, and bearings sufficient to carry its own weight and the belongings of its occupants; adequate brakes; minimum width of seven ft, maximum width of eight ft, and minimum interior height of six ft, two in.; ample ventilating devices; good insulation and an effective moisture barrier; and necessary road lights for highway safety.

Since trailer coach manufacturers are primarily assemblers, and not "producers" in the literal sense of the word, they depend on a huge army of suppliers for all the component parts which go into a trailer. Many of these suppliers are concentrated in the automotive industries, and to some of them the trailer field represents a sizable source of income. For example, one prominent supplier of wheels, hubs, drums, electric brakes, etc., sold \$2 million worth of equipment to the trailer coach industry in 1952 and expects that its 1953 sales will increase to \$2.5 million. Although most individual sales figures are confidential, an impressive conception of the vast number of familiar automotive suppliers who likewise supply the

(Turn to page 108, please)

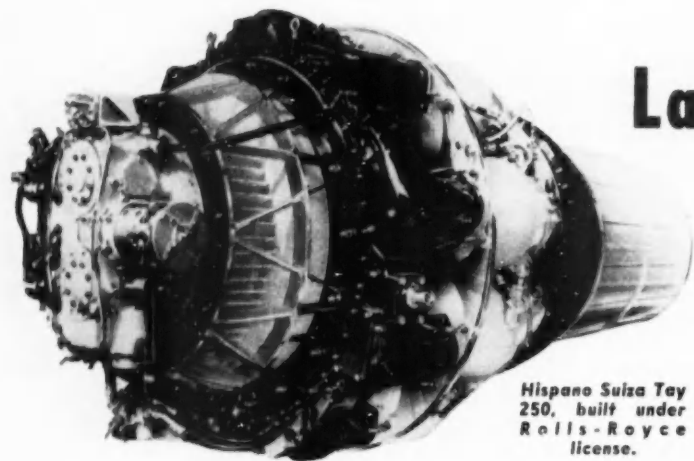




**SNECMA 101-C turbojet engine with afterburner.**



**The Vulcain, largest of the SNECMA jets, weighs 3080 lb and develops a thrust of 9900 lb.**



**Hispano Suiza Tay 250, built under Rolls-Royce license.**

## Latest European

**By W. F. Bradley**

**Special European Correspondent  
for AUTOMOTIVE INDUSTRIES**

At the present time the French aircraft industry employs about 60,000 people of whom 20,000 are working on airframe construction in State plants and 10,000 under private enterprise. For engine construction 8000 are in State organizations and 5000 workers are employed in privately owned plants.

Although there is a wealth of models, projects and prototypes, both for military and civil services, there is a reduced amount of production. This does not apply, of course, to planes and engines produced under license. Prominent among the French fighter craft is the Dassault 452 Mystère IV, a development of other Mystère models, and for which an order of 242 has been placed. This is the only machine of French construction which has figured in American contracts for NATO Air Forces. The Mystère IV is equipped either

**LE BOURGET AIRFIELD, PARIS, FRANCE**

**A**BANDONING the centrally located Grand Palais in Paris, the French aeronautical industry moved to Le Bourget Field for its 20th show which was held June 26 to July 6. A permanent building, adjacent to the airport, provided about 100,000 sq ft of floor space. As the airport was doing business as usual, no attempt was made to put on a very extensive flying display. Represented were France, the United States, England, Belgium, Italy, Holland, Luxembourg, and Sweden.



Hurel Dubois transport plane with two 1200-hp Pratt & Whitney engines.

## Aviation Developments

### New Planes and Power Plants Displayed and Demonstrated at International Aeronautical Meeting Held in Paris

with the SNECMA Atar jet engine or the Hispano-Suiza Tay, both of which provide the same performance. The Ouragan, also manufactured by Marcel Dassault, is being used by two Wings of the French air force. The Hispano-Suiza Nene is the standard power plant. Among other French fighter planes shown at Le Bourget was the Mistral, which is a version of the De Havilland Vampire, built by the South-East Nationalized Co., with a Hispano-Suiza Nene engine replacing the English power plant.

Another new fighter plane is the Vautour, built by the South-West Nationalized Co., and for which a production order has just been placed. Not much information has been given out regarding it, but is a mid-wing monoplane, with an engine nacelle slung beneath each wing, the engines being the SNECMA Atar 101B jet, which may be replaced by more powerful Vulcans now reaching production stage. The Vautour

is intended as an all-weather fighter, day or night interceptor, or for troop support.

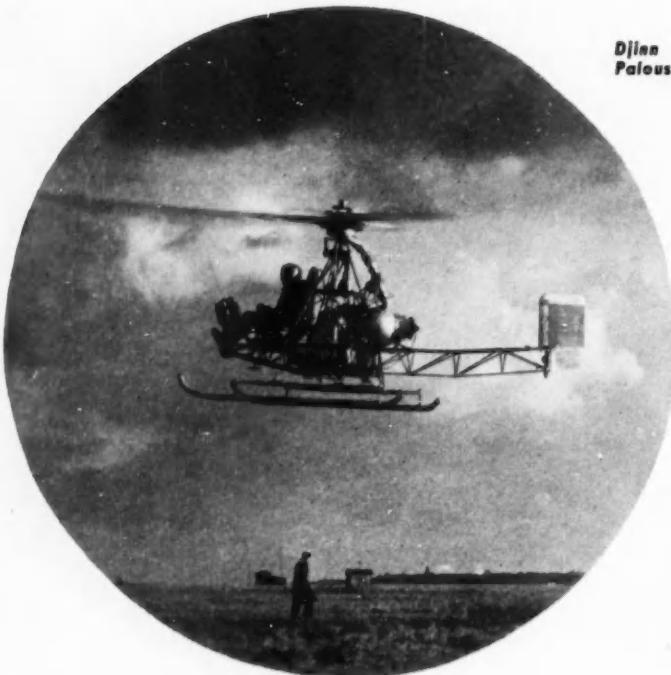
Breguet has the Vultur, designed as a carrier-borne attack and antisubmarine craft. This is a low wing monoplane with an Armstrong-Siddeley Mamba in the nose to give wide range of operation and a Hispano-Suiza Nene in the rear

fuselage to be used as a booster.

The S.O. 9000 Trident prototype, which is expected to achieve supersonic speed in level flight, has unusual features in small-area, thin-section wings, with two Turbomeca Marboré jet engines in wing tip nacelles and a rocket unit in the rear fuselage. It is a two-seater fighter, without military equipment, designed to take off and climb on the jet engines, using the rocket for boost at altitude. This plane is in the experimental stage.

The feature of the Baroudeur S.E. 5000 experimental fighter was the absence of an undercarriage and the use of a three-wheeled trolley, enabling it to take off after a run of about 2300 ft. The landing was on skids. Experiments in this direction have been carried out in order to overcome the disadvantage of the long runways necessary for modern jet planes.

Biggest plane in the French transport aircraft sec-



**Djinn helicopter which has a Turbomeca Palouste engine discharging compressed air from the rotor tips.**

tion is the S.E. 2010 Armagnac with a pressurized cabin laid out for 107 tourist passengers. Also in regular service is the Breguet Two-Decker, the latest version of which is powered by 2400 hp Pratt & Whitney R-2800 CA 18 engines. The plane, which is used principally on routes to Northern Africa, has a total weight of about 51 tons, a maximum stage length of 1242 miles at 248 mph and a maximum range of 2500 miles.

The Hurel Dubois H.D. 31 transport plane was characterized by its high aspect wing ratio; the latest model has a span of 148 ft, a length of 72 ft, and an aspect ratio of just over 20:1. The latest prototype of this high wing monoplane has two Pratt & Whitney R-1830 engines of 1200 hp each, and can carry a payload of 9700 lb over 1244 miles. The next development will be the H.D. 45, prototypes of which have been ordered, powered by Rolls-Royce Avon engines produced by Hispano Suiza. This version will carry 80 passengers at 453 mph over a distance of 1500 miles. Claims for this design are more economical commercial operation and a much shorter take-off.

Trainer planes cover a very wide range, and a number of them are jet propelled, mostly manufactured by Turbomeca. Outstanding among these is the first jet plane to be produced by Morane-Saulnier, the 755 Fleuret, which has side-by-side seats for instructor and pupil, and is powered by two Turbomeca Marboré II engines set side-by-side in the fuselage. This plane has a speed range of 428 to 484 mph, will climb to 30,000 ft in 17 minutes,

and requires about 1300 ft for take-off. The Fouga Magister has the same engines and same general layout, with tandem seating, and has a speed of 435 mph. The design provides for two machine guns, rockets and bombs, to be used for gunnery training.

In the well-equipped helicopter section, four major companies showed their development work. Outstandingly original was the 1220 Djinn manufactured by the SNCASO, a single-seater research type with skids, having as its power plant a Turbomeca Palouste generator, by means of which compressed air at the required pressure is ejected from the rotor tips. Quiet operation is one of the advantages of this arrangement. A two-seater development on the same lines is being planned. Another machine by SNCASO, the result of several years experimenting, has a Turbomeca Artouste turbo-compressor, supplying compressed air to small combustion

chambers on the rotor tips. Fuel is injected and the mixture ignited to produce a rotative jet.

Another type developed by the S.O. concern is the 1310 Farfadet convertiplane. A Turbomeca Artouste II turbine of 360 hp is mounted in the forward fuselage to drive the propeller, and a Turbomeca Arrius II further aft in the fuselage feeds compressed air to the rotor tips. No combustion takes place here.

Two groups stand out in French aviation engine production. They are State-owned SNECMA, a grouping of the original Gnome & Rhone and Renault concerns, and the private enterprise Hispano-Suiza. Firms of much smaller output, producing piston engines of low or medium powers are Potez and Salmson. In a

*(Turn to page 119, please)*



**Turbomeca Marcadau 400-hp turboprop engine.**

# Jet Engine Parts Chilled for Assembly

Several interesting applications of industrial chilling are used in the Malton, Ontario, plants of A. V. Roe Canada, Ltd. The firm is Canada's only manufacturer of jet engines and also produces complete jet aircraft. Four Sub-Zero units capable of temperatures down to  $-120^{\circ}\text{F}$  already are in use and two additional units are to be installed.

Major chilling equipment uses at A. V. Roe include: shrink fit of fixture and jig parts in the tool room as well as production part assembly; perishable tool treatment to increase tool hardness and life; gage treatment to affect dimensional stabilization; and thermocouple calibration.

In fixture production, a unit is used to eliminate press-fit procedures in the assembly of hardened steel bushing and plugs in mild steel or cast iron fixtures. The bushing or plug is held in the chilling unit for 15 to 30 minutes, depending on its size. The usual practice is to allow a shrink fit of 0.001 in. per in. of diameter.

In the tool room heat treating department, a special unit with a chilling chamber 30 in. by 30 in. by 36 in. is used to treat cutting tools and gages as part of the heat treat process.

Treatment of the tools at temperatures down to  $-120^{\circ}\text{F}$  during the heat treat achieves a substantially

complete transformation of retained austenite to martensite, giving greater hardness and strength together with improved ductility. Another result of the treatment is more uniform hardness and the relief of internal stresses and strains. Although A. V. Roe was unable to furnish specific tool life figures, engineers noted substantial increases in service.

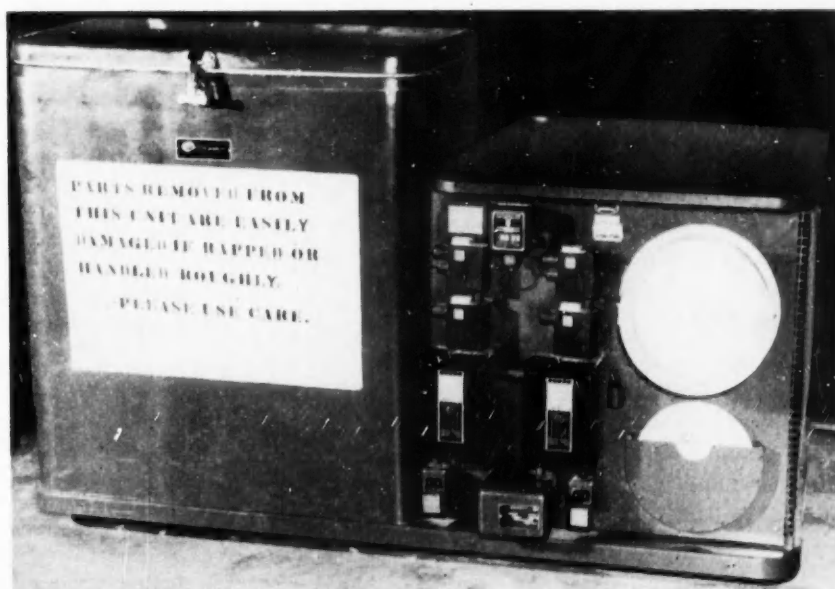
This same special size Sub-Zero unit is used to chill all types of gages—snap gages, plug and profile gages—producing quick aging of the steel and virtual elimination of warpage and distortion. Gage treatment is accomplished at temperatures between  $-100^{\circ}\text{F}$  and  $-120^{\circ}\text{F}$ . The chilling unit, in hours or days at the most, produces dimensional stabilization previously obtained in months and years of aging.

Aside from tool room heat treat uses, the other most important use of these units in this plant is in the assembly of engine parts. By the very nature of jet engine parts, the elimination of the high temperatures commonly used in shrink fit assembly is an outstanding advantage. There is less chance of damage to the part by warpage, no chance of oxidation, no further finishing step and greater ease of handling.

Two large Sub-Zero chilling units are used for production work. Following are a few typical shrink fit

*(Turn to page 116, please)*

**Typical industrial chilling machine used in the A. V. Roe Plant. This is Sub-Zero Model R-120 with 18 in. by 30 in. by 33 in. chamber. Complete temperature control and special recording thermometer seen at right.**





# How to Protect Yourself for Defense Contract Termination

By Kenneth G. Smith, of  
Kenneth G. Smith & Associates

**THE** author of this article, Kenneth G. Smith, is a management and financial consultant with a wide background in banking, industrial, and Government work. During World War II he served on the Army Signal Corps Renegotiation Panel, and for a number of years was employed by the banking house of Drexel & Co.

Mr. Smith is the author of the article "How to Protect Yourself for Renegotiation" which appeared in *Automotive Industries* July 15, 1951, in addition to various articles on accounting and finance. He addressed a series of 14 regional renegotiation conferences organized by *Automotive Industries* and attended by 500 top executives in the automotive, machine tool, metals, and petroleum industries.

As renegotiation and contract termination adviser to *Automotive Industries*, Mr. Smith has offered to answer inquiries on the subjects addressed to this publication.

**C**HANGES in the Armed Forces procurement requirements, which may be due to new technical developments and for other reasons, make it necessary to terminate existing contracts for the convenience of the Government.

The experience gained during World War II from administering termination settlements formed the background for the preparation of the Armed Service Procurement Regulation, Section VIII, which deals with contract termination.

This Section establishes uniform policies relating to the termination of contracts of any department entered into under the Armed Services Procurement Act of 1947.

The duties of the contracting officer, the prime contractor and the subcontractor, and their responsibilities are covered by these regulations.

## Duties of Contracting Officer

When the determination has been reached that a contract is to be terminated for the convenience of the Government, the contracting officer should review and comply with that section of the contract dealing with terminations.

In order to avoid any future misunderstandings the termination notice should contain the following basic elements:

1. The effective date of termination.
2. The extent of termination, partial or total.
3. Reason for termination.
4. Special instructions should they be necessary.

A prime contractor should be certain that he thoroughly understands the termination for he in turn must pass on to the subcontractors and suppliers similar cancellation notices.

When the prime contractor has been properly notified, the contracting officer has the additional following steps to take:

- a. To assist the prime contractor in setting up the proper organization to handle the termination.

DEPARTMENT OF DEFENSE		REPORTS CONTROL	Form Approved
SCHEDULE OF ACCOUNTING INFORMATION		SYMBOL: DD FORM 129	Budget Bureau
To be used by prime contractors submitting termination claims under Section VIII (Termination for Cause of the Government) of the Armed Services Procurement Regulation. Also suitable for use by subcontractors submitting settlements with prime contractor or intermediate subcontractors.			
<input type="checkbox"/> (ALL) PROPOSAL APPLIES TO (check one) <input type="checkbox"/> A PRIME CONTRACT WITH THE GOVERNMENT <input type="checkbox"/> SUBCONTRACT OR PURCHASE ORDER		CONTRACT	
SUBCONTRACT OR PURCHASE ORDER NO. (S)		STREET ADDRESS	
CONTRACTOR WHO SENT NOTICE OF TERMINATION		CITY AND STATE	
NAME		NAME OF GOVERNMENT AGENCY	
ADDRESS		GOVT. PRIME CONTRACT / CONTRACTOR'S REFERENCE NUMBER	

DEPARTMENT OF DEFENSE		REPORTS CONTROL	Form Approved
SETTLEMENT PROPOSAL		SYMBOL: DD FORM 130	Budget Bureau
(INVENTORY BASIS)			
Read Instructions Sheet for use of Contract Settlement Proposal Form			
FOR USE OF A FIXED-PRICE PRIME CONTRACTOR OR FIXED-PRICE SUBCONTRACTOR			
<input type="checkbox"/> (ALL) PROPOSAL APPLIES TO (check one) <input type="checkbox"/> A PRIME CONTRACT WITH THE GOVERNMENT <input type="checkbox"/> SUBCONTRACT OR PURCHASE ORDER		CONTRACT	
SUBCONTRACT OR PURCHASE ORDER NO. (S)		STREET ADDRESS	
CONTRACTOR WHO SENT NOTICE OF TERMINATION		CITY AND STATE	
NAME		NAME OF GOVERNMENT AGENCY	
ADDRESS		GOVT. PRIME CONTRACT / CONTRACTOR'S REFERENCE NUMBER	

DEPARTMENT OF DEFENSE		REPORTS CONTROL	Form Approved
TERMINATION INVENTORY SCHEDULE B		SYMBOL: DD FORM 131	Budget Bureau
<input type="checkbox"/> (ALL) PROPOSAL APPLIES TO (check one) <input type="checkbox"/> A PRIME CONTRACT WITH THE GOVERNMENT <input type="checkbox"/> SUBCONTRACT OR PURCHASE ORDER		CONTRACT	
SUBCONTRACT OR PURCHASE ORDER NO. (S)		STREET ADDRESS	
CONTRACTOR WHO SENT NOTICE OF TERMINATION		CITY AND STATE	
NAME		NAME OF GOVERNMENT AGENCY	
ADDRESS		GOVT. PRIME CONTRACT / CONTRACTOR'S REFERENCE NUMBER	
PRODUCT COVERED BY TERMINATED CONTRACT OR ORDER		LOCATION OF MATERIAL	
GOVERNMENT PRIME CONTRACT NUMBER		CONTRACTOR'S REFERENCE NUMBER	
DESCRIPTION			

Headings of some of the forms used in contract termination.

- To review and pass upon the subcontractors' and suppliers' settlement claims.
- Negotiate a settlement with the prime contractor which will include all costs.
- Determine what should be done with the inventory of finished and partially finished products.
- Make payments in accordance with the agreements reached with those affected with the termination, taking into consideration any credits received from the disposal of inventory.

In arriving at a proper and equitable settlement with the prime contractor and the subcontractors, consideration must be given by the contracting officer to certain factors such as:

- Are the costs submitted in the termination claims reasonable?
- Are the settlement charges, storage expenses and disposal credits reasonable?
- Consider the problems created in the contractor's plant as a result of the termination.
- Review the contributions to the defense effort, such as special research, production efficiency, other cost savings, etc., attributable to the termination contract.
- Reasonable profit to be allowed after taking into consideration the various stages of completion of the work.

#### Procedure of Prime Contractors

A prime contractor has certain obligations to the Government and duties to perform for subcontractors, as soon as he has received notice of a termination.

- Stop all work at once in accordance with the notice he has received.

- On all work being performed in his own plant.
  - Discontinue placing any additional subcontracts.
  - Don't issue any more purchase orders.
- Comply with the contracting officer's request for the completion and delivery of any portion of the contract.
  - Terminate all unperformed or partially performed subcontracts and purchase orders.
  - Segregate all materials and inventory which now become the property of the Government.
  - Advise the contracting officer of any actions, legal or otherwise, which have any bearing on the

(Turn to page 126, please)

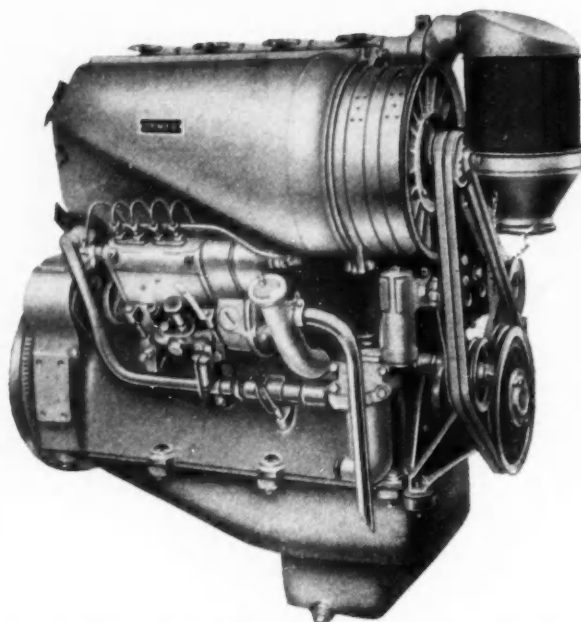
#### Costs Which Will Be Disallowed

The contracting officer will not approve costs which, in his opinion, have no bearing on the contract and those specifically disallowed by the regulations.

Such items as bad debts, any commissions and bonuses paid for obtaining or negotiating for a Government contract, and contingency reserves are not allowed. Other expenses, such as contributions, donations, entertainment, and other burden expenses not incurred or attributable to the terminated contract will be disallowed.

# Use of Diesels Almost Universal for German Farm Tractors

By Otto V. Drtina



*Klockner-Humboldt-Deutz four-cyl, four-stroke aircooled Diesel.*

COLOGNE, GERMANY

**P**RACTICALLY all of the farm tractors shown at the German Agricultural Exhibition which was held in Cologne during the first week of June were powered by Diesel engines. A large number of the engines were aircooled, and three firms displayed aircooled, two-stroke Diesels. There were three general types of tractors at the exhibition: conventional design with engine at front, rear wheel drive, and driver's seat over the rear axle; four wheel drive with driver's seat at the front or at the rear; and rear engine design with provision at the front for attachment of implements.

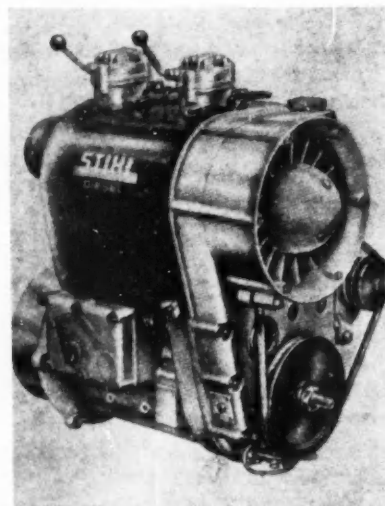
A display of conventional design farm tractors was presented by

Allgaier Werke GmbH of Uhin-gen. The latest model is powered by a four - cyl, four - stroke aircooled Diesel designed by Dr. Porsche, well known designer of the Volkswagen and Porsche cars. The largest

Allgaier tractor has a 44-hp aircooled Diesel and a six-speed transmission with fluid clutch.

Other tractors with aircooled Diesel engines are Klockner-Humboldt-Deutz, Eicher, Bungartz, Fahr, and Kramer. Two-stroke aircooled Diesels are used on Stihl, Normag, and Bungartz tractors.

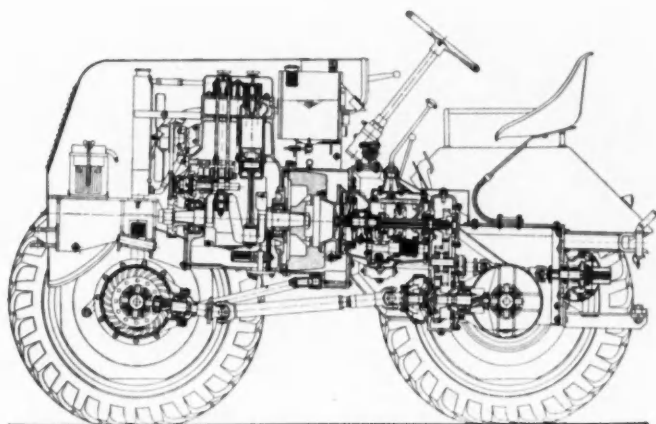
Among the four wheel drive tractors was the Nordtrac-Stier. Two sizes were shown; one with a 20-hp MWM Diesel and the other with a 30-hp engine of the same make and type. Ursus also presented four wheel drive tractors in two sizes, both equipped with MWM Diesels. The smaller has a two-cyl, 28-hp engine, and the larger a 40-hp unit. A new 12-hp tractor, shown by Bambi, features four-wheel steering.



*Stihl two-cyl, two-stroke, aircooled Diesel. It has a piston displacement of 91.5 cu in. and develops 30 hp at 1850 rpm.*

## ACRES OF CULTIVATED AREA PER TRACTOR

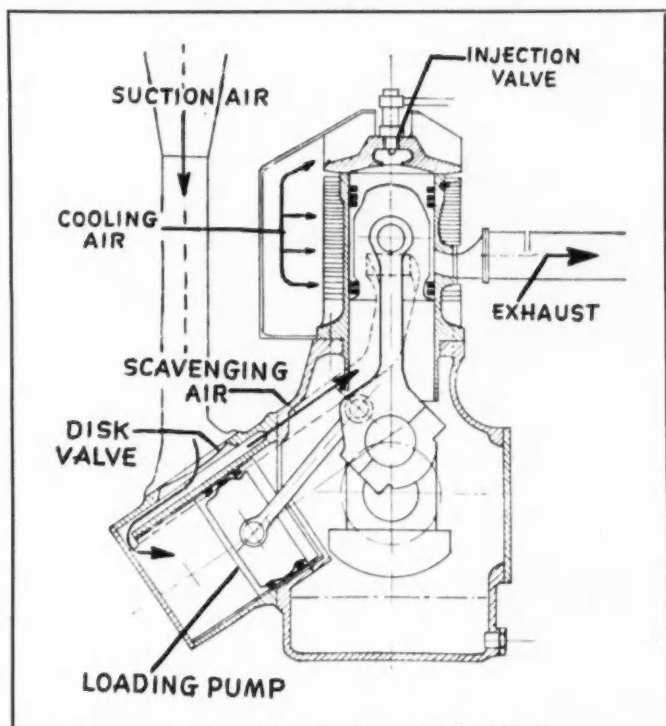
Great Britain.....	57
Switzerland.....	62
New Zealand.....	72
Western Dem. Germany.....	168
Australia.....	247
Canada.....	247
Austria.....	279
France.....	385
C. S. R.....	469
Hungary.....	795
Russia (U. S. S. R.).....	988
Eastern German Zone.....	1,027
Rumania.....	1,532
Poland.....	1,887
Bulgaria.....	2,125



Nordtrac-Stier 30-hp tractor with drive to all four wheels.



Allgaier tractor powered by a four-cyl, four-stroke aircooled Diesel.



Normag-Zorge 12-hp, two-stroke, aircooled Diesel. Note the piston type pump for scavenging air.

The Lanz-Alldog was typical of the tractors with rear-mounted engines and provision at the front for attachment of implements. Its single-cylinder, 32.7 cu-in. engine develops 12 hp at 3000 rpm. Other equipment of the same general type was shown by Ruhrstahl and Schmotzer-Combi.

One of the most unusual engines on exhibition was the Normag-Zorge 12-hp, two-stroke, aircooled Diesel.

It features a large piston-type pump for scavenging air. Piston displacement is 64.5 cu in. and it is claimed that fuel consumption is only 0.37 lb hp/hr.

A new development in two-wheel trailers is the provision for driving the wheels from the power take-off of the tractor. This arrangement assures good performance under difficult driving

## EXPORT OF AGR. TRACTORS FROM W. GERMANY IN 1951

Value in German Marks

Turkey	45,993,000
Argentina	17,646,000
France	15,034,000
Brazil	13,759,000
Italy	10,479,000
Belgique	9,832,000
Australia	9,138,000
South Africa	7,708,000
Netherlands	5,344,000
India	4,189,000
Denmark	3,891,000
Chile	3,804,000
Greece	3,663,000
Sweden	3,637,000
Switzerland	3,474,000
Spain	3,199,000
Algeria	3,019,000
Uruguay	2,955,000
Luxemburg	2,768,000
Norway	2,410,000
Egypt	2,242,000
Jugoslavia	2,039,000
Finland	1,405,000
Austria	1,006,000
French Morocco	954,000
Cuba	782,000
Iran	718,000
Portugal	685,000
Great Britain	683,000
Tunisia	655,000
Syria	609,000
Port. West Africa	584,000
Madagascar	457,000
Columbia	337,000
Ireland	317,000
Canada	299,000
New Zealand	260,000
Mexico	233,000
Kenya-Uganda	219,000
Brit. Camerun	178,000
Peru	145,000
Irak	131,000
Span. Africa	136,000
Indonesia	121,000
Malaya	116,000
South-West Africa (Brit.)	110,000
Franc. West Africa	76,000
U. S. A.	51,000

Balance divided into various overseas countries

Total exports 191,000,000 DM: (twice as much as in 1950).



## WORLD PRODUCTION OF FARM TRACTORS IN 1950

	Units
U. S. A. ....	558,000
England .....	120,000
Russia .....	97,000
Germany (West & East) .....	62,000
France .....	14,200
C. S. R. ....	12,000
Rest of Europe .....	34,800
Australia .....	8,000

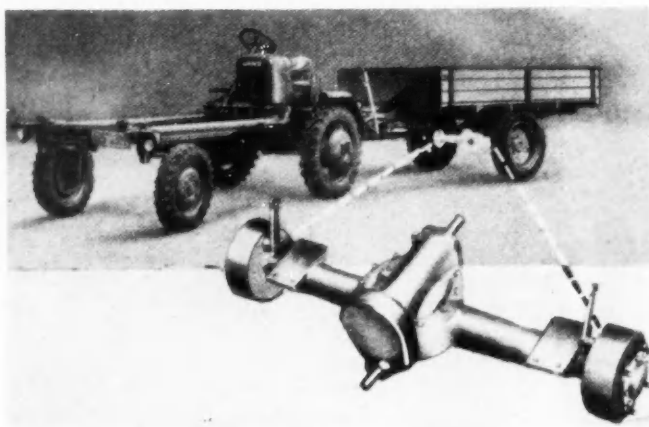
## WORLD EXPORT OF FARM TRACTORS 1950

	Units
U. S. A. ....	90,000
England .....	84,000
West Germany .....	12,500

conditions such as may variously be found.

There are 43 German manufacturers making approximately 123 different types and sizes of tractors. All are powered by Diesels except one which has a kerosene engine and one with a gasoline power plant.

Production of tractors has been increasing steadily in Germany since World War II, and now that country ranks as the fourth largest maker. In the export of trailers, West Germany is outdone only by the United States and England.



Tractor with engine mounted at rear and single-axle trailer with wheels driven from power take-off of tractor.



Lanz-Alldog tractor, for attachment of implements at the front.

# Industrial Mobilization Realigned on Broader Base

Policy on Defense Mobilization Fairly Well Set  
But Details as to What Is Needed Not Yet Completely Worked Out

By Karl Rannells

Washington Bureau  
AUTOMOTIVE INDUSTRIES

**M**ORE details of the Government's aim for a broad mobilization base are beginning to appear. A recent policy statement by Defense Mobilizer Arthur S. Fleming called for creation of industrial facilities to round out a production potential, sufficient for not only war production but civilian needs as well.

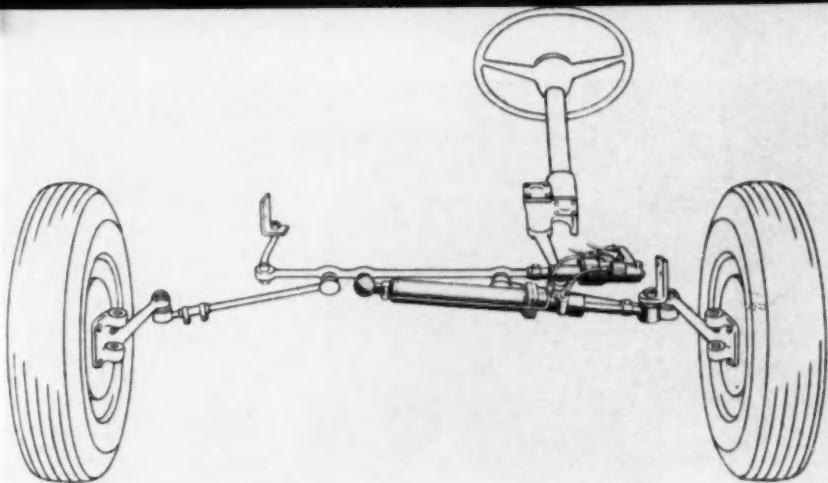
Details as to how the administration is going to do this are still in a state of flux. They will be decided after completion of a study now under way by the Office of Defense Mobilization. The study is expected to show: Productivity of industry "for hypothetical

war years," as well as the amount of support to be expected from allies; rock bottom civilian requirements under war conditions; ability of industry to supply "principal tools, equipment, components, materials, skills" and so on during such period.

At first glance this appears contrary to views of Defense Secretary C. E. Wilson, who is reported to be in favor of a narrower mobilization base. Action on the tank and truck program, which will be slowly "phased out" from its present \$160 million a month level to about \$50 million by next May or June, seems

(Turn to page 136, please)

Typical passenger car installation using two-unit type of Bendix hydraulic power steering.



## Details of *Bendix Linkage Type Power Steering*

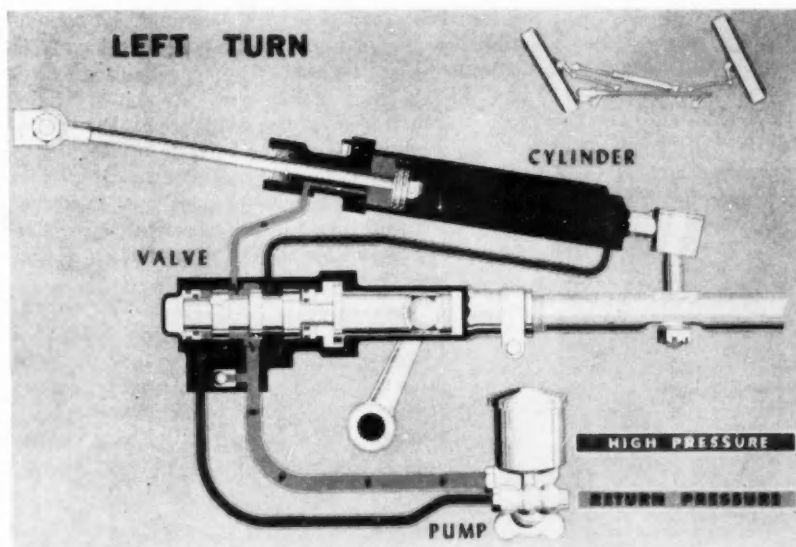
**L**INKAGE type power steering equipment, said to provide all of the safety and comfort advantages of power steering for commercial vehicles as well as passenger cars with a minimum of complication and cost, is announced by the Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. According to Bendix this equipment will be installed in four different makes of production automobiles, including Packard and Nash which released the installation for 1953 production, and Ford which announced adoption of the device recently.

Installation of the power cylinder and control valve

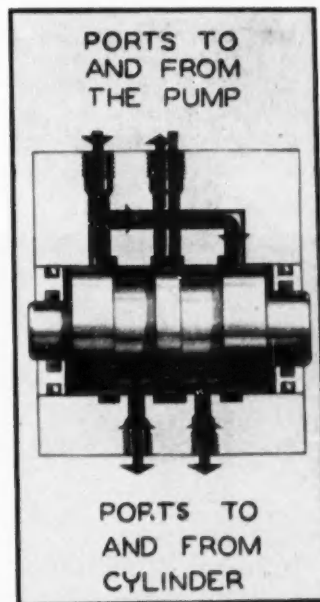
(not a field installation), can be made by the vehicle manufacturer without changing the geometry of the steering linkage. In effect, the existing steering system, including the steering gear, remains intact.

The hydraulic power cylinder is mounted at any convenient place where it can be connected to act directly upon the steering cross rod or equivalent member. Power for steering is then applied in the

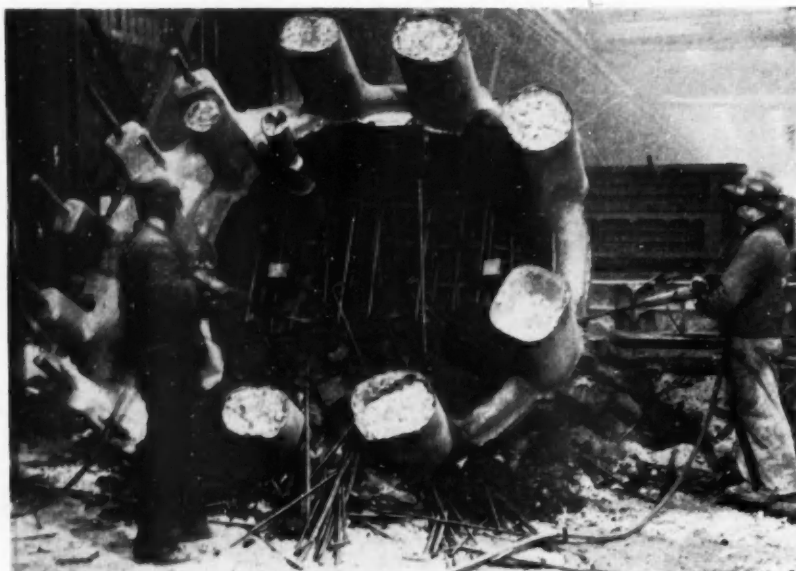
Turn to page 106  
please



Position of valve and flow of fluid during left turn. For right turn, valve moves to opposite end and flow of fluid is reversed in cylinder.



Neutral position of valve showing flow of fluid from and to the pump.



By  
Thomas  
Mac New

*Here sand is being cleaned off a turret casting. Note the support rods inside of the turret, and the large headers around the periphery of the casting.*

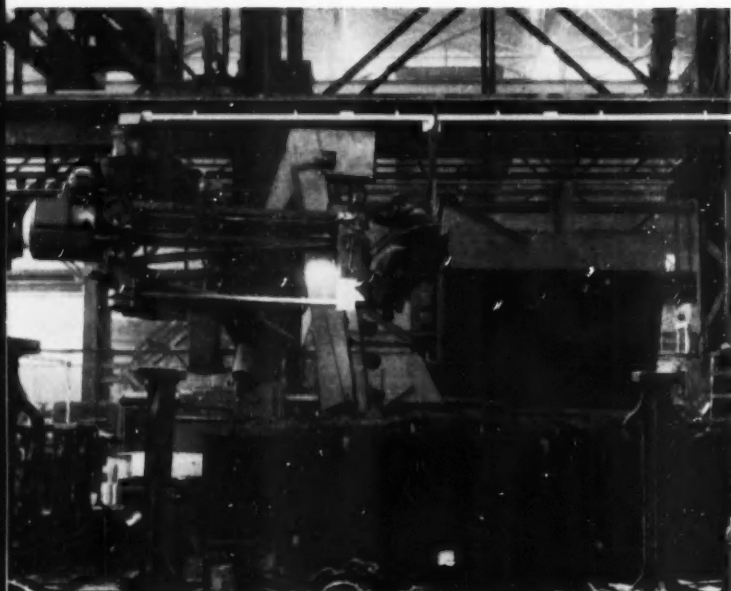
## Straight Line Setup for Casting Tank Hulls

**H**ULLS and turrets for the Army's M-48 medium tank will be rolling off the casting floor of Birdsboro Armocast, Inc., Birdsboro, Pa., at a high rate when the plant hits its peak production stride. Although currently undergoing extensive changes—including additional buildings, renovations to existing quarters, and the installation of new machinery—the plant is now casting one-piece hulls and

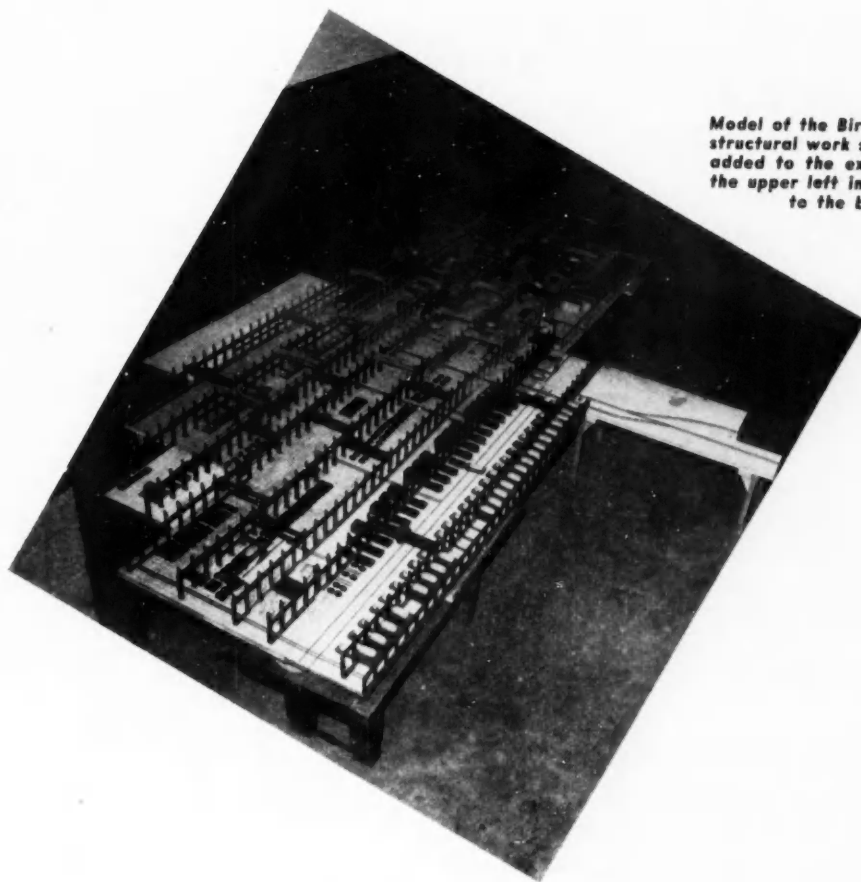
turrets on a limited basis. When ultimately completed, sometime this year, the \$40 million, 688,000 sq ft facility will supply the Budd Co. and the Chrysler Delaware Tank Plant with the two main body castings of the M-48.

Straight line production with a minimum of manual handling has been designed into the plant layout so that Birdsboro will be able to produce the huge castings in a steady flow. As shown in the illustration of the plant layout, the manufacturing area has been so divided as to efficiently handle core preparation, cope and drag preparation, pouring, shakeout, annealing, welding, inspection, and other operations necessary for production of this nature.

Today, with construction going on around the present production floor, two 50-ton open-hearth furnaces are in operation melting the alloy steel used for armor castings. According to Birdsboro metallurgists, there is no critical alloy being used in the heat. Two 60-ton open-hearth



*Three of these Beardsley & Piper sand slingers are used for packing sand in the molds. The slingers have a capacity of one ton of sand per minute.*



*Model of the Birdsboro Armorcast plant. The dark structural work designates the new extension being added to the existing plant. Work proceeds from the upper left in the illustration through the plant to the betatron at the far right.*

are moved to the huge drying ovens. The drying ovens, supplied by the Foundry Equipment Co., hold a temperature of 450 F for skin drying the sand. Ovens used for the drag are of the mobile type, but the cope ovens are stationary.

Before pouring the casting, Birdsboro metallurgists run from four to five tests on each furnace heat. After satisfactory completion of the tests, the metal is poured at 2875-2925 F. Although the rough-cast hull, after cleaning, weighs 14½ tons, the as-cast piece weighs approximately twice that amount — including the large headers that are necessary for making the

furnaces are in the process of being installed. Thus far, the plant has cast over 2000 tons of armor steel.

Flask size of the impressive one-piece hull is 27½ ft by 12½ ft, and a total of 80 tons of sand is used for the mold—40 tons in the cope and 40 in the drag. The cope, in this case, forms the bottom of the tank hull and the drag forms the top. When ready for pouring, the cope weighs a total of 62 tons and the drag weighs approximately 90 tons; this includes the dry-sand cores, steel chill plates, and steel support rods.

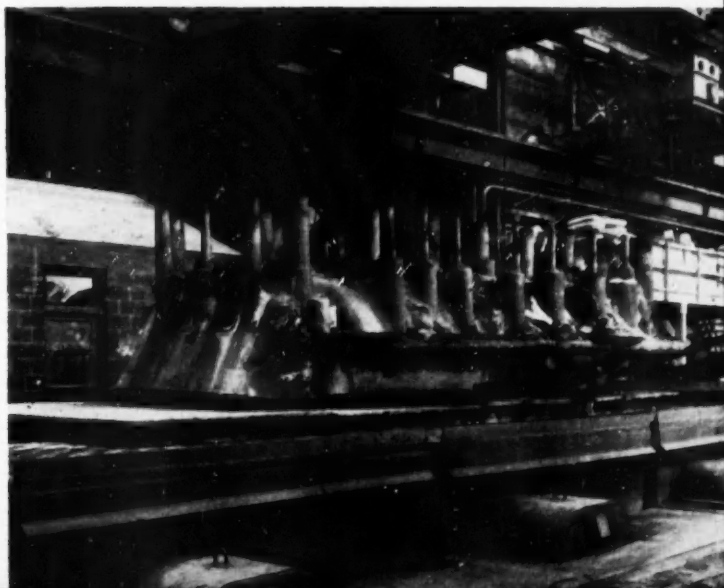
It is of interest that the various types of sand used for making cores has been artificially colored with different hues to acquaint the workers with the type of sand that should be utilized for different cores.

Three sand slingers are currently being used for mold preparation. These machines, built by Beardsley & Piper, have an output of one ton of sand per minute. Green sand is utilized for the operation. After the mold halves are completed, they

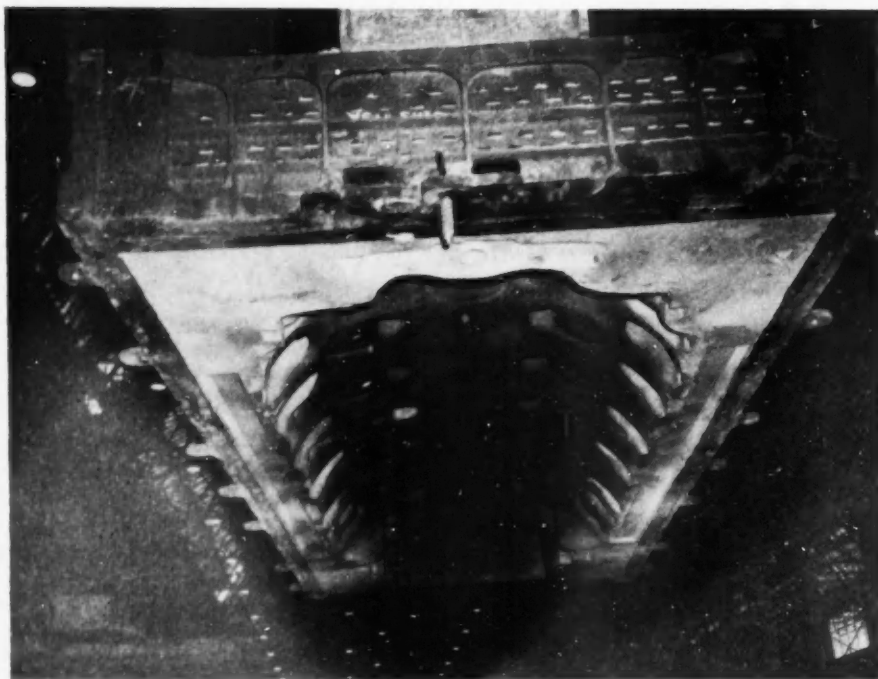
unit in one piece. The same is true for the turret which weighs about seven tons with the headers knocked off.

At one time the headers constituted a major problem in the production of large one-piece castings, but Birdsboro engineers devised a method whereby they would have a relatively thin section where they join the casting proper. This, of course, eliminates much

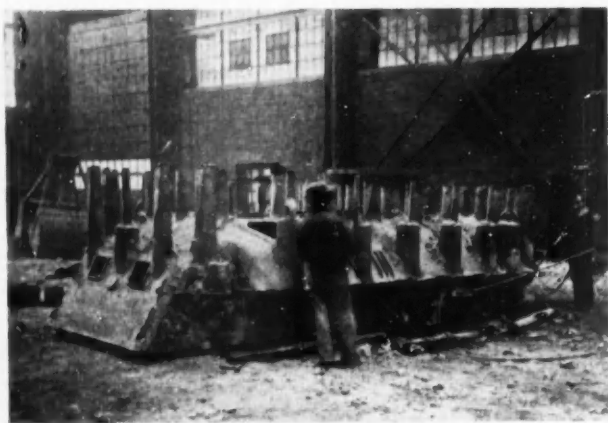
*After removal from the mold the hull casting is placed on this Hewitt Robins shakeout machine. The unit has an eccentric drive and the bed is mounted on springs; this combination gives the machine a vibratory motion.*







**Hull cope mold of the tank is being raised preparatory to being placed on the drag. The cope forms the bottom of the tank hull.**



**Workers use pneumatic tools to chip sand off of the cast hull after the shakeout.**



**Cope pattern of the M-48 turret.**

chipping and the chance of damage to the casting.

After the pouring operation, the casting is lifted from the mold and transferred to the shakeout equipment. The Hewitt Robins Floatex shakeout machine is of the vibratory type and uses an eccentric drive with springs to obtain the vibratory motion. With machinery of this nature, the shakeout operations on the casting and flask are performed in five min each; whereas, if done by hand, it would take an estimated 28 man days.

Birdsboro is having installed self-propelled transfer furnace cars that will be used on the annealing line. When the plant is finished there will be 39 heat treat furnaces and four quench tanks. Hulls and turrets are multi-cycle heat treated through normalizing, austenizing, and tempering. Wheelabrator equipment is being installed for shot blasting of the castings.

At the present time, the castings must be heated for any welding operations. Castings are laid on the floor and surrounded by gas lines to bring them to temperature. Workers must wear suits of aluminum coated asbestos cloth for protection from the heat as the welding operations are carried out.

Steps are being taken by plant engineers to develop a method whereby the castings can be welded without preheating.

In a separate, monolithic structure located near the main casting plant, a huge 24 million volts betatron x-ray machine has been installed for inspection of the hulls and turrets.

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A complete pump service for  
either your new production or for im-  
proving your present models. We offer an efficient  
pump—a fine impeller—or a superior automatic shaft seal.

We have been designing and building water and oil pumps since the pioneering days of the automotive industry. We started with it and have actively participated in every era of its development, so we are now "headquarters" for pumps for automatic transmissions and are building for some of today's famous ones. Our experience in efficient pump design, and where to apply fine workmanship is invaluable in this fast developing engineering field, for which nothing less than the very best and most suitable in materials and the closest possible tolerances and fine finishes will do.

Our long experience is yours for the asking. Let us tackle your job. You want either advantage in performance or price. We have both. We will take your assignment as an obligation to obtain for you a highly efficient performance at minimum cost.



At the top is illustrated a new development in constant pressure oil pumps for the many services where oil at high pressure and delivery is required.

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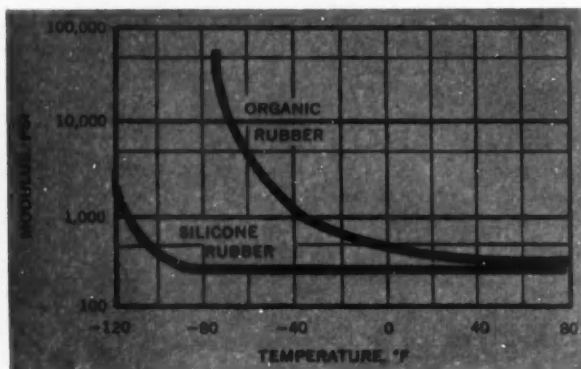
# REMARKABLE DESIGN NEW SILICONE DEMONSTRATED BY TEST...



High temperature resistance: Elevated temperatures have no appreciable effect on the 1000-1200 volts per mil dielectric strength of glass cloth coated with SE-100.

## SE-100 — IDEAL FOR ELECTRICAL AND MECHANICAL APPLICATIONS!

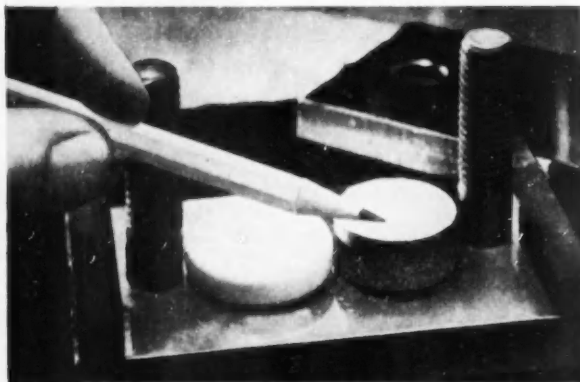
General Electric's new silicone rubber coating compound, SE-100, combines outstanding heat resistance, electrical and physical properties for a wide variety of electrical and mechanical applications. SE-100 may be coated on glass or organic fabrics for service at high or low temperatures or where resistance to weather, ozone, corona or chemicals is required.



Flexible at -120 F: A glance at the blue curve shows the difference (Young's Modulus in flexure) of SE-550 versus organic rubber after 24 hours.

## SE-550 — STILL FLEXIBLE AFTER 24 HOURS AT -120 F!

G.E.'s new extreme low-temperature silicone rubber, SE-550, combines high strength and elongation with maximum low-temperature usefulness. SE-550 shows practically no increase in modulus at -100 F and retains useful flexibility at -120 F. This flexibility is achieved without sacrifice of high-temperature resistance or any of the other desirable properties inherent in silicone rubber.



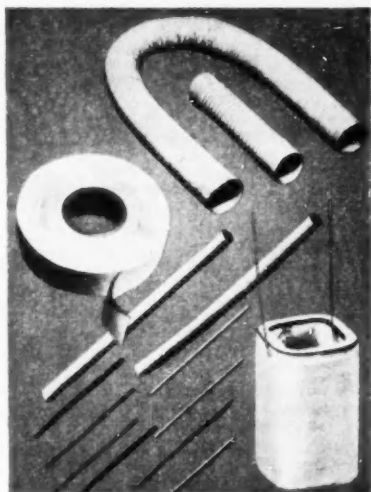
Compression test: Same-size pieces of ordinary silicone rubber and SE-360 are compressed for 22 hrs. at 350 F. Note how SE-360 (right) "comes back" to original size.

## SE-360 — MORE "COME BACK" THAN ANY KNOWN RUBBER!

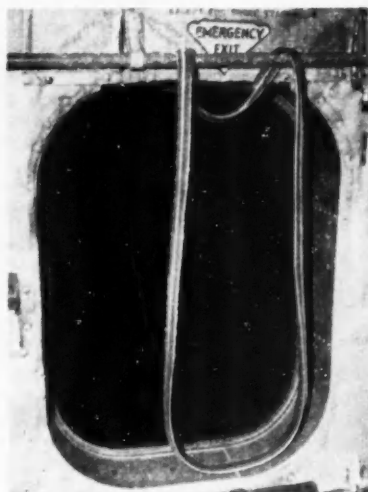
G.E.'s new low compression set silicone rubber, SE-360, is designed to provide more positive sealing action in parts subject to compression at elevated temperatures. In addition to its outstanding low compression set, SE-360 has unusually low shrinkage when cured. This means parts with more uniform properties, closer tolerances and opportunities for your fabricator to cut scrap loss.

# POSSIBILITIES OF THREE GREAT RUBBER COMPOUNDS

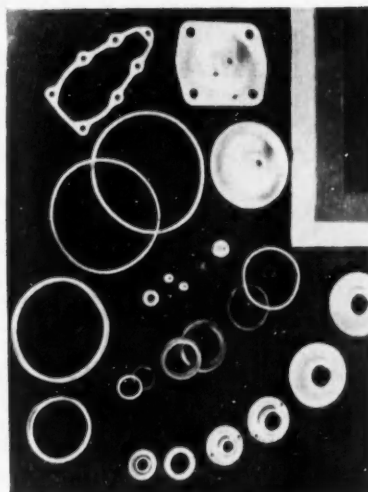
## CONFIRMED BY APPLICATION



G.E.'s SE-100 silicone rubber is finding steadily increasing application in the electrical industry for coating cloth, tapes and sleeving; for coating glass-served wire; for encapsulating coils. Among the many mechanical uses for SE-100 are ducts and tubing; gaskets and seals; diaphragms.



Gaskets for emergency hatches (shown here at 50 below zero F) astra domes and access windows on the Douglas Globemaster are now made of G.E.'s SE-550 silicone rubber because it remains flexible and maintains a seal at extremely low temperatures; does not stick to metal after long inactivity.



O-rings, gaskets and seals are being designed with G.E.'s new SE-360 silicone rubber for applications where sustained resilience at high temperatures is required. Aircraft, automotive and railway design engineers find SE-360 ideal for jet engine parts, transmission seals and Diesel gaskets.

### FOR MORE INFORMATION

about these new G-E silicone rubber compounds, just mail the coupon! You will also receive a free copy of "Imagineering with Silicone Rubber" which describes other G-E silicone rubber products and tells how you can put them to work.

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**GENERAL  ELECTRIC**

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General Electric Company  
Section 351-6C  
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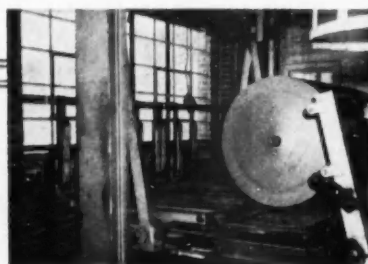
# Conveyors

for  
**MECHANIZED  
MATERIALS  
HANDLING . . .**



Typical of many belt conveyors located throughout plant is above installation which delivers chips to digesters.

**From Pulp Logs  
to Paper Rolls**



Shuttle car (with roller flight conveyor) automatically delivering roll of paperboard to lowerator.

Thousands of feet of belt conveyors were designed, manufactured and installed by Webb for a large new pulp and paperboard plant located in the State of Georgia, U.S.A. The installation shown above automatically delivers 24,000 cubic feet of pulpwood chips from storage bins to digesters and is typical of durability and performance of many other Webb Belt Conveyors throughout the plant.

This modern plant has also utilized other types of Webb Conveyors to completely mechanize their materials handling. For instance, it is necessary to unload 1,000 cords of pulp wood each day from trucks and railroad cars—special chain conveyors were installed that withstand the pounding of logs and continue to operate day after day. Another example of the complete mechanization employed is a combined roller flight conveyor, lowerator and shuttle car system that delivers finished and wrapped rolls of liner board from the Fourdrinier on one floor to scales and either storage or shipping on another floor.

From pulp logs to finished paper rolls, every operation is mechanized, so that much manual labor is eliminated, production increased and manufacturing costs reduced. You too can utilize Webb Conveyors and Engineering Services to improve your materials handling. Inquiries regarding design, cost saving features or technical data are invited.



Drag chain conveyor with flights for handling bark.

## Additional Webb Services

Through its subsidiaries, Control Engineering and Webb Forging Co., the Jervis B. Webb Co. designs and manufactures electronic and electrical controls for conveyors, machine tools, etc. Also quality drop forgings.

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that provides complete  
information  
on Webb conveyors

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# Eaton SODIUM COOLED VALVES save money for Truck Owners

Eaton Sodium Cooled Valves operate at considerably lower temperatures than do conventional valves and, therefore, last several times longer.


In general, maintenance of Eaton Sodium Cooled Valves in heavy duty truck engines is scheduled only at time of major engine overhaul. No in-between trips to the shop are necessary for servicing the valves. Engine output is maintained at high levels over long mileages. In many millions of miles of heavy-duty operation, Eaton Sodium Cooled truck valves have proved their ability to keep trucks on the road and out of the shop.

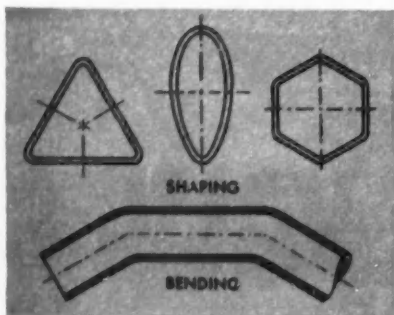


# EATON

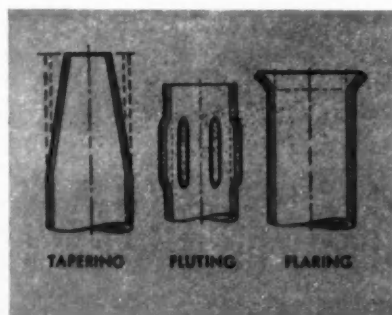
MANUFACTURING COMPANY  
CLEVELAND, OHIO

VALVE DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

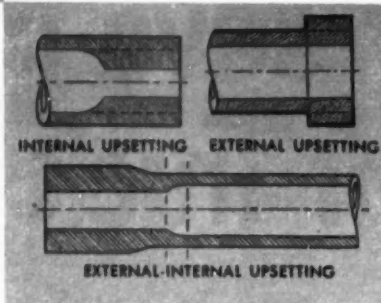
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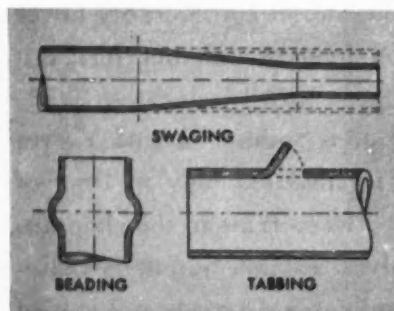
OSTUCO  
TUBING  
is versatile!



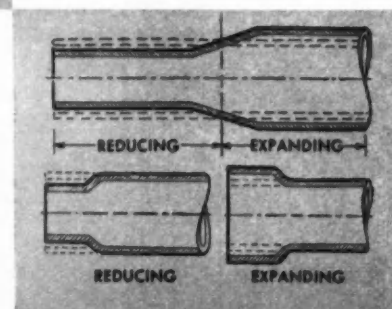
OSTUCO  
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There's practically no limit to the things OSTUCO can do with Seamless and Electric Welded Steel Tubing to help you produce lighter, stronger, better looking products at lower cost. Only a few of the operations are shown above.

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# News of the MACHINERY INDUSTRIES

By Thomas Mac New

Recent Survey Shows  
Steady Increase in the  
Volume of Metalwork-  
ing Machinery Being  
Shipped to Canada,  
Europe, and Asia.

## Foreign Importers

We recently had the privilege of attending a meeting of the AAMI (American Association of Machinery Importers) in New York City. At this meeting, Milton D. Thalberg, president of the organization, spoke on the free trade policy. During the talk, in quoting the Detroit Board of Commerce report on free trade, he stated that it derided the old fear of cheap foreign labor. According to Mr. Thalberg, the report went on to read that actually foreign labor is often expensive because it is much less productive (than American labor).

The Association is planning an open forum shortly and it is planned to invite representatives of the U. S. machine tool industry.

## Machinery Export Analysis

The Council for Technological Advancement has made quite a comprehensive survey concerning the export market for capital goods. It is pointed out that exports are about 11 per cent of the total U. S. capital goods sales and that capital goods are 25 per cent of the non-military exports.

Of the total capital goods exported, metalworking machinery accounts for 10.5 per cent of the market, according to the latest available figures. Slightly over 19 per cent of the total factory shipments of metalworking machinery is scheduled for export trade.

If the rate for the first quarter of this year persists, \$320.4 million worth of metalworking equipment will be shipped to foreign users during 1953. This would be an increase of approximately 26 per cent over the 1952 period, based on the first quarter figures.

Latin America, according to the facts and figures of the report, is the largest U. S. capital goods customer. However, since 1948, the metalworking machinery index has taken a great dip in that market. The index, based on 1938, was 909 for 1948 and this has dropped to 592 in 1952 for metalworking equipment. All other markets, Northern North America, Europe, and Asia have shown rather steady increases. Canada has been gaining

most rapidly on South America, and if the rate persists for any length of time Canada will take the lead as the largest importer of U. S. capital goods. This market has been steadily increasing for the metalworking machinery producers also, as shown by the fact that the index number stands at 591 for 1952 as compared with 441 for 1951 and 383 for 1948—the base year is 1938.

It is interesting to note that although the Canadian trade barriers are lowered to England, there are more and more U. S. goods being pur-

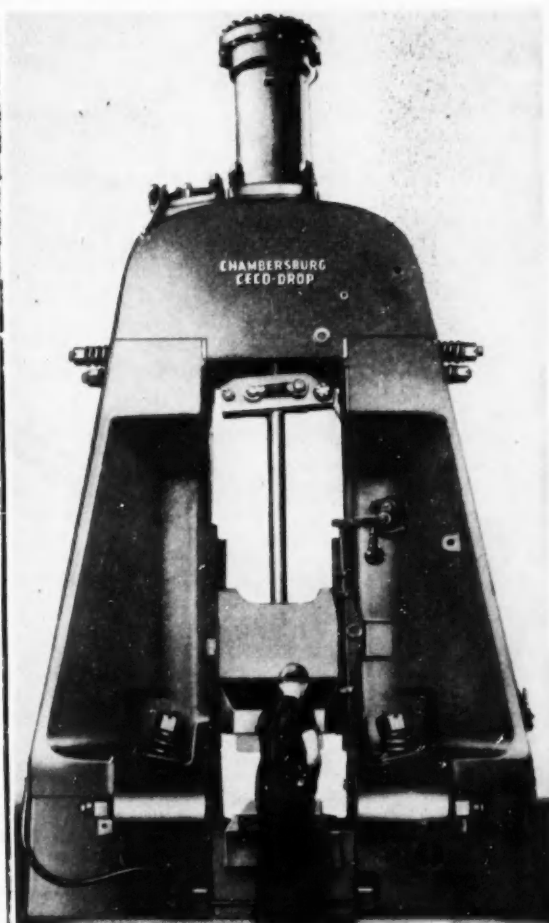
chased in Canada. It is evident that American production, product quality, and good salesmanship still pay big dividends.

## Salt Bath Research

Ajax Electric Co., Philadelphia, reports that it has investigated the merits of the Schaaber Dilatometer—a heat treat testing device developed in Germany—while performing research to improve salt bath heat treating processes. Principle of the instrument is based on the volume change

## LARGEST CHAMBERSBURG CECO-DROP

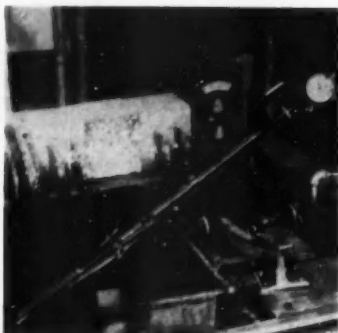
Chambersburg Engineering has shipped this 6000 lb Ceco-Drop hammer to the Westinghouse Steam Turbine Division in Philadelphia, Pa. It will be used with four other Ceco-Drops, ranging from 2500 to 5000 lb, in forging steam turbine blades. It is the largest Ceco-Drop ever built by Chambersburg. The firm also announced that an even larger unit—an 8000 lb hammer for use in England—is under construction.





which takes place in the transformation of austenite.

Company engineers report that the Dilatometer offers many possibilities such as more accurate and quicker determinations of: transformation



Recently, the Ajax Electric Co. did some research with the Schaeber Dilatometer—a heat treating testing device—while carrying on investigations for improving salt bath heat treating processes. The company is reported to have had much success with the new instrument.

time for austempering; martempering time cycles available before transformation begins; and the severity of the quenching medium. Also, it serves as a control check of steels prior to processing.

## Bliss Out With Quarterly Pub

Number 1 of the new E. W. Bliss Co., Canton, Ohio, quarterly external magazine "Bliss trends" has just been published. James T. Harrington, advertising manager and editor of the new publication, points out that the book will carry case histories of Bliss equipment, and, as its name implies, will report the latest developments in presses and other Bliss products.

## Aircraft Company Forms Machinery Division

Machinery and equipment of the type that Longren Aircraft Co., Torrance, Calif., has been using for the production of aircraft parts will be built by the firm for sale on the open market. Hampden Wentworth, managing director, stated that the company is entering the special machinery manufacturing field by forming a machine building division. The first equipment to be made available includes stretch forming presses, curved jaws for stretch presses, forming twistlers and hand-forming contour fixtures. Additional machinery is said to be under development.

## Around the Industry

Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn., recently announced various top management changes. Vice president Richard W. Banfield succeeds Charles M. Pond (retired) as manager of the small tool and gage division. Other changes include: Edward N. Clark, superintendent of the small tool division; Harold G. Lucas, superintendent of the gage division; William R. Back, superintendent of aircraft parts manufacture; Albert L. Knapp, general superintendent of the machinery division; Edward J. Ferris, assistant general superintendent of the machinery division; Edward J. Shages, manufacturing superintendent of the machinery division; and Sandford G. Etherington, Jr., supervisor of planning.

The automatic control and Uni-Flo divisions of the Barber-Colman Co., Rockford, Ill., have opened up two new factory branch offices, one in Syracuse, N. Y., and the other in Jacksonville, Fla. K. C. Watson will head the Syracuse office. D. W. Minick will manage the Jacksonville office.

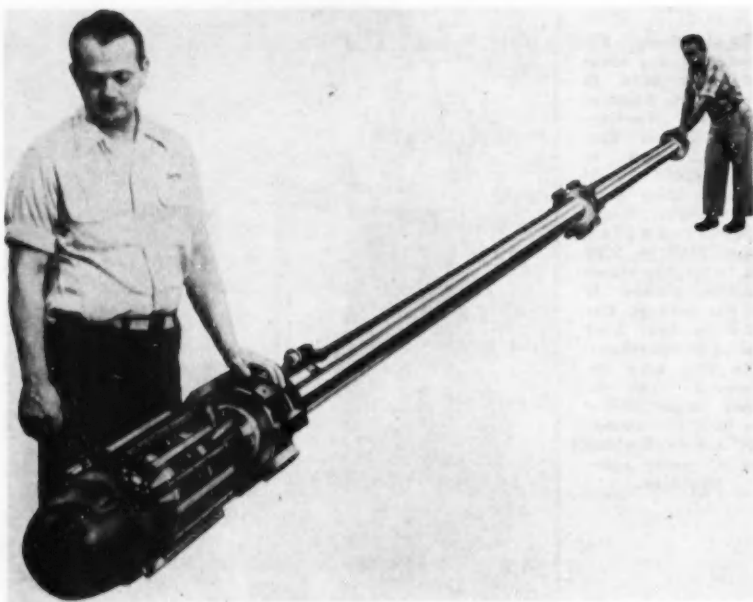
Hydropress, Inc., New York City, has been awarded a contract for a 2400-ton capacity hydraulic extrusion press and accumulator station by the Ankara, Turkey, Government-owned brass plant.

Clearing Machine Corp., Chicago, has announced the appointment of Rudolph Winters as Superintendent of its Hamilton, Ohio, plant.

Norton Co., Worcester, Mass., has established a job lapping department with capacity to handle a multitude of job lapping projects.

Norton Behr-Manning Overseas, Inc., Worcester, Mass., dedicated a new plant last month in Belfast, Northern Ireland. This brings to 12 the number of grinding wheel and sandpaper plants operated by the export organization of Norton Co.

## HONE FOR BORING ATOMIC GUN BARREL



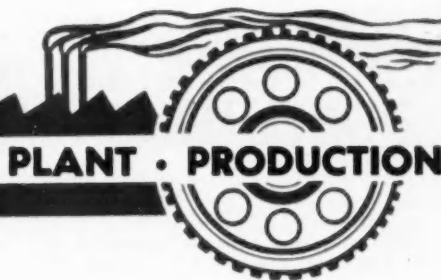
This large hone—69 ft long—was designed and built by Micromatic Hone Corp. for one of the finishing operations on the bore of the 280 mm atomic gun barrel. A feature of the enormous tool is that it has a gage built into its nose. This permits checking the barrel at any point without removing the large hone.

## Erratum

On page 71 of the July 15 issue it was erroneously stated that the Roosa-Master fuel injection pump is a British product recently licensed for manufacture in the U. S. Actually, this pump is made by Hartford Machine Screw Co., Hartford, Conn., and C.A.V., Ltd., of London, England, has been licensed to manufacture and sell it abroad.

# EQUIPMENT

## PLANT • PRODUCTION



FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

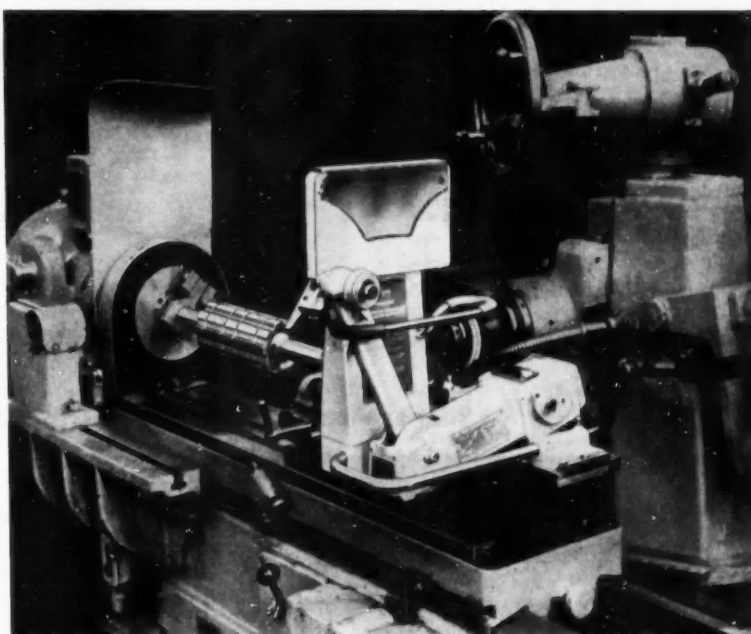
### Precise Wheel Truing Attachment for Spline Grinders

The Diaform wheel forming attachment is now being applied to spline grinding machines.

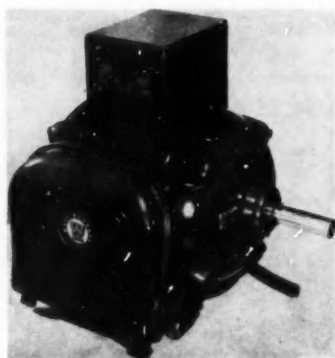
Diaforming is a procedure which form-trues grinding wheel contours accurately—and insures re-truing of any given form to the same degree of accuracy as often as required. This precision wheel forming attachment works on the pantograph principle, giving the user a five to one or 10 to one (depending on size Diaform), favorable ratio between the template followed and the diamond that trues the grinding wheel. The template is made five or 10 times oversize and corresponds to the wheel shape—that is, opposite to the work to be ground.

The procedure is said to be comparatively simple, and an operator soon acquires the necessary skill to true complicated forms on grinding wheels with "tenths" precision. The illustration shows the Diaform attached to a spline grinder and with an involute form-template on the mounting bracket. *Pratt & Whitney, Div. Niles-Bement-Pond.*

Circle 66 on page 89 for more data



P&W Diaform mounted on a spline grinder.



Westinghouse single-phase motor.

### Capacitor-Start, Capacitor-Run Single-Phase Motor

A single-phase motor that is both capacitor-start and capacitor-run is currently available. Called the type CAP-2, the motor is made in five,  $1\frac{1}{2}$ , and 10-hp ratings, and is a four pole, 220 v, 60 cycle motor.

Capacitor-run motors operate at near-unity power factor, and their design is such that starting current is reduced about 25 per cent, with the same high starting torque. The auxiliary winding remains in the circuit

during operation and is in series with the running capacitors. Relays merely remove the starting capacitors when the motor approaches full speed. The main winding is directly across the line.

Where three-phase power is not available, this design will permit the use of larger single-phase motors. *Westinghouse Electric Corp.*

Circle 67 on page 89 for more data  
(Turn to next page, please)

**NEW****EQUIPMENT****PLANT • PRODUCTION**

For additional information, please use postage-free reply card on page 89

(Continued from page 81)

### Gage Set Checks Micrometer Accuracy

A "micrometer checking set" designed for checking one in. and two in. micrometers has been added to an extensive line of gage blocks, gages and gaging accessories. The set includes three gage blocks, 0.250 in., 0.6500 in. and 1.000 in. respectively. These are used individually or in combination for checking the accuracy of the micrometer screw at various points in its travel. Evidence of wear in the micrometer screw can be discovered with such checks.

Two optical parallels of fused quartz, which are part of the set, provide an accurate method for checking the condition of the micrometer spindle and anvil faces. In making such checks, a parallel is held between

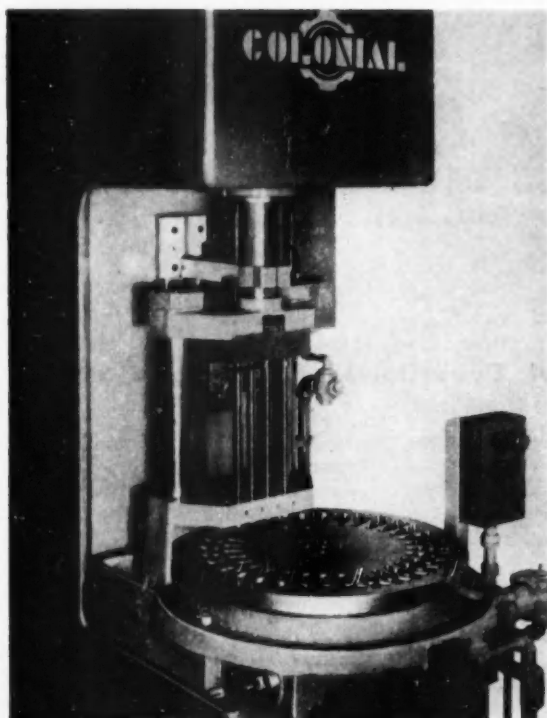
Do-ALL micrometer checking set.



the gaging surfaces of the micrometer like any ordinary part. Then under a monochromatic light, such as the Monolight, the fringe lines appearing on the micrometer gaging surfaces may be read to determine deviation from flatness, parallelism or squareness of the spindle faces to the spindle axis. The optical parallels are of different sizes—one is 0.500 in. thick and the other is 0.0125 in. thicker. These two different sizes permit optical checks to be made of the spindle at two points in its rotation,  $\frac{1}{2}$  a turn or 180 deg. apart. *The DoALL Co.*

Circle 68 on page 89 for more data

### Rocker Arms Continuously Strip Broached



Colonial strip-broaching machine.

Continuous strip-broaching and burnishing of approximately 1800 automotive rocker arms per hour is achieved on a recently engineered 10-ton, 36-in. stroke utility press. With complete unified tooling, the installation includes indexing table fixture plus automatic ejection. After broaching, the rocker arms simply drop through slots in the indexing table, and through a chute into a container. The operator merely drops the parts in recesses of the table as it indexes past him.

Burnishers on the broaches reduce drag on the return stroke, permitting fast strip-broaching with long tool life. *Colonial Broach Co.*

Circle 69 on page 89 for more data



These rocker arms are broached at the rate of 1800 per hour.

## Continuous Feed Press for Light Stampings

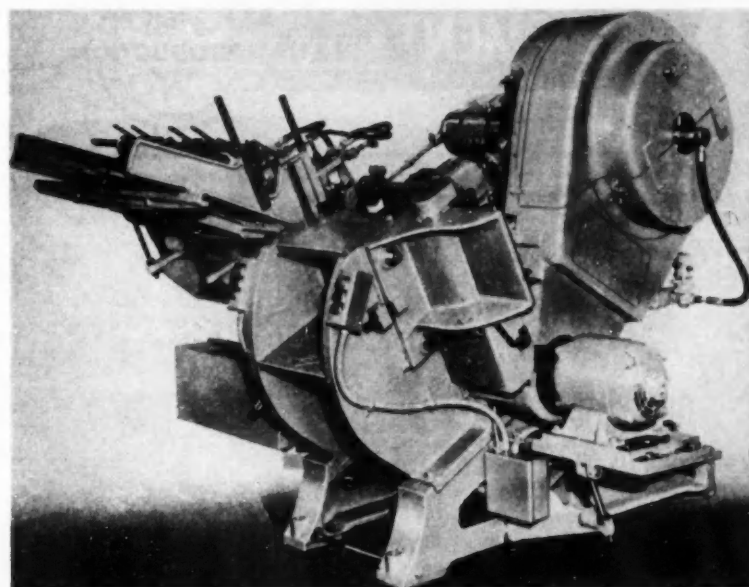
The Hamilton No. 401 strip feed press for high speed production of light stampings has been newly redesigned to increase the speed with multiple dies. In addition, the continuous feed stack provides for at least one hr production run before re-loading. Rated capacity of the machine is 25 tons.

Features of the machine include an improved frame design using a welded steel structure by means of which alignment is maintained without tie bars. Use of a Fawick Air-Flex clutch and brake directly on the crankshaft is said to assure smooth starting, protection to crankshaft and dies, and practically instantaneous stopping. They are factors in minimizing maintenance also, according to the maker.

Sectional friction shoes in the clutch, applied by an air-inflated tube, are claimed to provide uniform pressure around the drum, eliminate the possibility of improper adjustment and make wear compensation automatic.

The brake is disengaged instantly by air pressure as the clutch engages and the brake is spring-actuated at the instant of clutch engagement. The press is stopped automatically if the air supply fails.

The adjustable vacuum cut-off has been speeded up and simplified. The air supply line is completely closed before the short lines to vacuum cups



*B-L-H 25-ton capacity press for light stamping work has continuous feed.*

are opened to atmosphere for breaking the vacuum. This unit operates in conjunction with the cross feed which takes the strips from the suction cups into and under the finger bar in the table. The press operates on its own built-in vacuum system, or on any regular shop system.

Safety for the operator is provided

through controls requiring two hands and an open electric circuit when the flywheel guard door is open. Automatic lubrication is optional. Certain proven features of the original No. 301 press have been carried over into the No. 401 machine. *Baldwin-Lima-Hamilton Corp.*

Circle 70 on page 89 for more data

## Nut Blank Machine Features Increased Production

An improved Budd-Ranney nut blank machine now makes it possible for manufacturers and users of nut

blanks from ¼-in. to two-in. diam to sharply increase production over previous methods, according to the maker.

Both bar stock and drills rotate simultaneously in opposite directions in the machine.

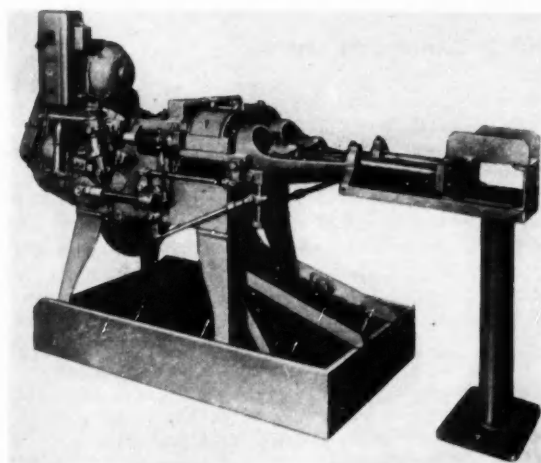
The Budd-Ranney machine utilizes two tools to perform the cutting-off operation. The machine makers state that a savings of 10 per cent in stock is effected on average size nuts.

Chuck mechanism on the machine is actuated by the centrifugal force of rotating weights rather than by cam action, insuring positive locking of the chuck pads on any size stock. Stock with as much as a 1/32-in. variation across flats is chucked securely without changing the chuck pads.

The machine has twin spindles (in models producing nut blanks up to 1½ in. diam) enabling two bars to be machined simultaneously. *Miller Glass Engineering Co.*

Circle 71 on page 89 for more data

(Turn to next page, please)



*Budd-Ranney nut blank machine.*



**NEW****EQUIPMENT****PLANT • PRODUCTION**

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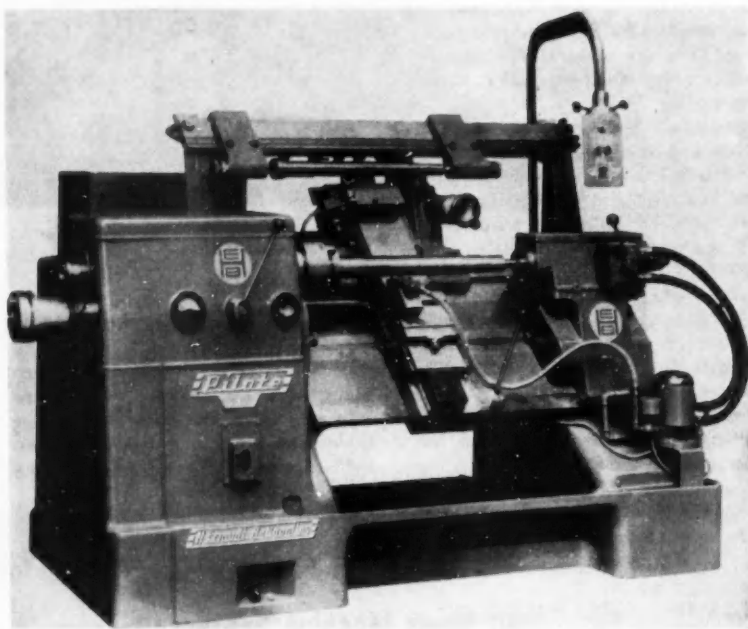
(Continued from page 83)

## Automatic Hydraulic Copying Lathe

What is claimed to be the first completely automatic hydraulic copying lathe, equipped with a hydraulic carriage feed has been introduced into the United States and Canada.

Developed and produced in France, the machine reportedly has all the advantages of a single spindle automatic lathe, and the set-up can be changed in less than an hour. Both roughing and finishing may be carried out at the same operation by utilizing one or more tools. The machine is equally suitable for first or second operations. It may be arranged for boring and outside turning at the same operation.

The cross-slide is arranged at 90 deg to the bed and provided with slots to enable it to be equipped both with front and back tools as well as a boring bar. Its transverse motion is controlled hydraulically by the copying device, following a flat templet fixed in an indexing drum which is designed to carry a maximum of eight different templets. The front and back tools may both be used for copy-



H.E.B. hydraulic copying lathe.

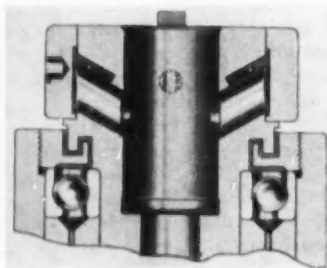
turning, using a different templet for each cut. The back tools can also be arranged for plunge cutting automatically as, for example, when turning a groove or undercut. In addition, the back tools may be used for taking a light finishing cut utilizing a "Z" stop which is said to enable tolerances of 0.0005 in. to be maintained on production runs. A surface finish of 32 micro-inches may easily be maintained, according to the maker.

H. E. B. Machine Tools, Inc.

Circle 72 on page 89 for more data

## High-Precision Spindle Has Quick Change Feature

Recently announced is a quick-change, high precision spindle to be



Fosdick B-F spindle.

used on Fosdick jig borers and automatic positioning machines. Known as the "B F Spindle," it incorporates a high precision version of the "Beaver" tool holder built integrally with the spindle. Tools can be changed in less than 10 seconds with such accuracy that hole sizes may be repeated within  $\pm 0.0001$  in. without resetting the boring tools, according to the maker.

Straight shank adapters are used to hold tools which are not already provided with Beaver shanks. The tool is locked in the spindle by two cam-ring-actuated plungers which

draw the flanged adapter shank firmly against the ground nose of the spindle. A spanner wrench is used to rotate the cam ring a fraction of a revolution to lock or unlock the tool. After unlocking, the tool does not drop out until the cam is rotated to the end of its travel.

Adapters are available to accommodate Numbers 1, 2, 3 and 4 Morse taper, 5, 7, 9 and 10 Brown and Sharpe tapers, No. 40 N.M.T.B. taper and straight bores from  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. and  $\frac{1}{2}$  in. to  $1\frac{1}{4}$  in. in eighths. The Fosdick Machine Tool Co.

Circle 73 on page 89 for more data

## Shear Has Capacity Up to 9/32 In.

The Giant model shear, that is now available, has been designed for contour and straight inside and outside shearing, beading, louvering and joggling. It has a capacity up to 9/32 in. thick mild steel. The shearing principle is said to eliminate resistance to feeding and turning the work. In addition, feeding of material may be started while ram is operating.

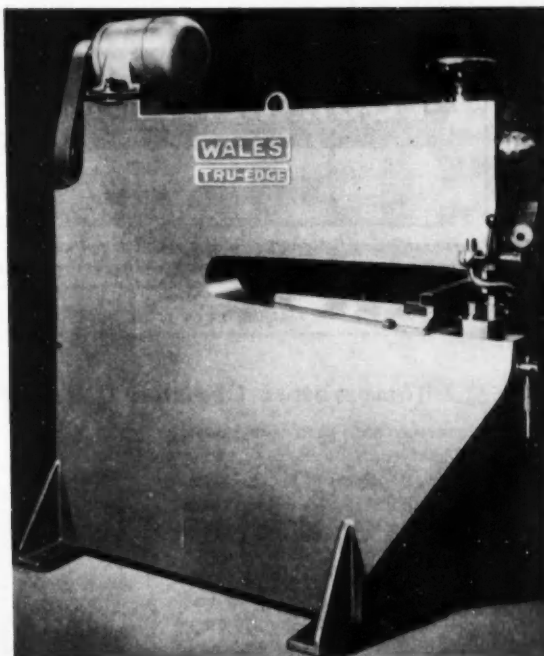
A unique cam design is reported to provide vibrationless operation. Material is not punched but is sheared to provide a smoothly cut edge.

An adjustable bottom shearing die can be set for various thicknesses of material. This is one of two adjustments for operation in varying gages and types of sheet metal.

This Giant Model Tru-Edge shear cuts from 10 to 36 fpm, depending on gage and material. Throat depth is 36 1/2 in. *Wales-Strippit Corp.*

Circle 74 on page 89 for more data

*Wales-Strippit Giant model shear.*



## Two Press Brakes Feature 4 1/2 In. Stroke Adjustment

Now available to the trade are a six ft and eight ft sheet metal form-

ing power press brake. Some of the features are as follows:

Ram and welded steel frame are both normalized.

Alloy steel adjusting screws with buttress thread and revolving alloy bronze nuts.

Precision adjustment of ram.

Balanced cast steel flywheel runs on ball bearings.

Movable parts have ball or roller bearings throughout with the exception of alloy bronze bearings on alloy steel forged and balanced eccentric crankshaft.

Adjustable variable speed drive and 1 1/2 hp motor.

Foot treadle adjustable to any position of bed with uniform action at any point.

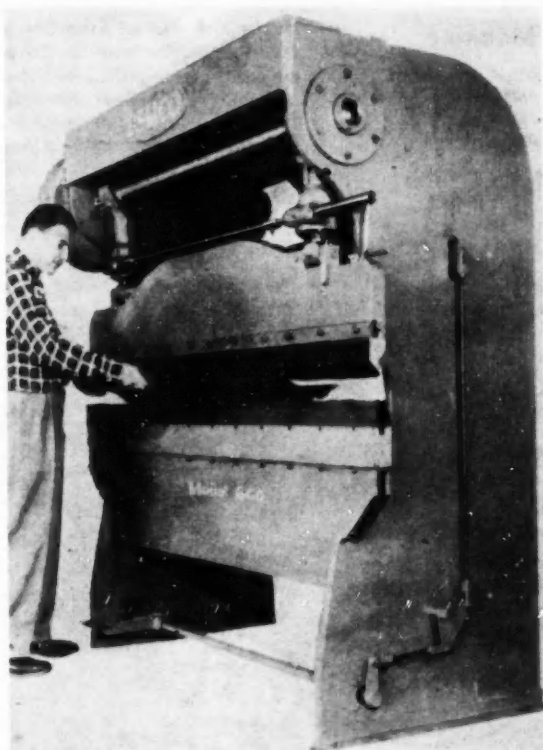
Die holder included as standard equipment.

It stands 79 in. high, 44 in. deep and the width is 66 in. Ram and bed plates are 72 in. and 96 in. long respectively for the two models.

A die area of 12 in. shut height is provided with a three in. stroke and 4 1/2 in. adjustment of stroke. A variable range of 16 to 40 strokes per minute is obtained by hand wheel adjustment. *Service Machine Co., Inc.*

Circle 75 on page 89 for more data

(Turn to next page, please)



*Semco press brake.*

**NEW****EQUIPMENT****PLANT · PRODUCTION**

For additional information, please use postage-free reply card on page 89

(Continued from page 85)

### Temperature Chamber Is Non-Magnetic

Development has been announced of a completely non-magnetic chamber for determining effects of temperature on electrical fields in the development testing of pure metals. It is constructed entirely of brass, copper, aluminum, rubber, Bakelite, glass, wood and Fiberglas. All motors and electrical components are located approximately six ft away to eliminate effects of their electrical fields.

The unit produces any temperature from  $-112^{\circ}\text{F}$  to  $+68^{\circ}\text{F}$ , with close temperature control. A special inner chamber thermally governed by vernier control assures holding of temperatures to  $\pm 0.1^{\circ}\text{F}$ . *Bowser Technical Refrigeration.*

Circle 76 on page 89 for more data



Bowser non-magnetic, temperature test chamber.

### Vertical Heavy-Duty Hydraulic Hack Saw Machine

Several design improvements have been incorporated in a recently announced vertical extra heavy-duty hydraulic hack saw machine. These improvements include a larger hydraulic pump, improved feed piston and piston ring design, a greatly improved timing of the cam action to effect precision timing and bringing the saw blade in and out of the work.

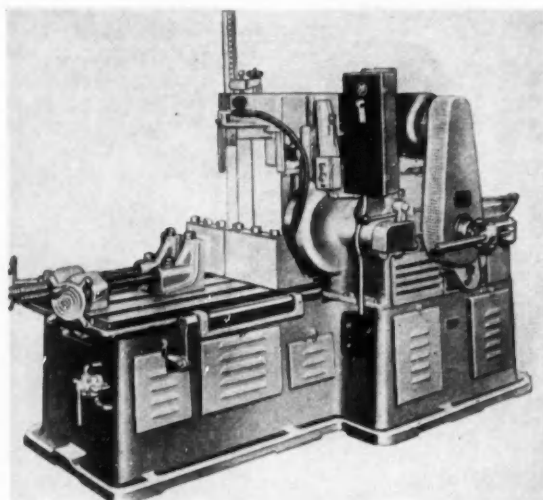
The feed pressure is applied through a much improved hydraulic system with the saw blade operating vertically having an improved larger lift on the relief or non-cutting stroke. With the saw blade operating vertically with a steady flow of coolant applied from the top, all the chips are washed into the chip tray.

The machine now has all the slide bearings lined with hardened and ground removable type inserts, and replaceable heat treated shoes; all revolving heavy-load bearings are ball or roller bearing anti-friction; and an air cylinder counterbalances or offsets the weight of the saw frame in its reciprocating motion.

The machine is capable of sawing metal up to the rate of 10 sq in. per minute, depending, of course, on the shape, size and kind of material being cut. *Peerless Machine Co.*

Circle 77 on page 89 for more data

Peerless vertical hack saw machine.



### Galvanized Shielded Enclosures

A complete line of galvanized single-shielded enclosures for suppressing the radio-frequency radiations of induction heating, dielectric sealing, diathermy, and other industrial and laboratory equipment, has been announced as available.

Priced less than \$500 for the eight ft by eight ft by eight ft model, the screened enclosures are claimed to provide more than 40 db attenuation from 14 kc to 400 mc. Up to 66 db attenuation at standard VHF television frequencies can be expected. This is said to be more than ample for the large majority of industrial applications.

These galvanized single-shielded enclosures consist of a number of standard size panels rigidly bolted together from the inside. Each panel is a framework of kiln-dried, select white pine covered with a single layer of 22-mesh galvanized steel screening. The entire enclosure is easily erected, enlarged, or dismantled in just a few hours. Units are designed so that they may be readily installed to enclose a machine that otherwise would cause objectionable radio or TV interference. Standard floors are  $\frac{3}{4}$  in. plywood with a loading capacity of 300 lb per sq ft. Floors with greater loading capacity are available.

Virtually any kind of power, water, gas, or other service may be brought into the enclosure. Small access doors are available which speed production by allowing the continual transfer of material in or out of an enclosure. *Ace Engineering & Machine Co.*

Circle 78 on page 89 for more data

# NEW

# PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

## Automobile Battery for All Seasons

Now in production is the Weather-master automobile battery with a "Climate Control" feature that reportedly will automatically adjust battery power output to meet the diverse demands of summer and winter driving conditions.

It is claimed that the battery will provide up to 20 per cent more winter cranking power, and be capable of cold cranking nearly five minutes at 300 amp at zero F. At the same time, it will be resistant to the battery-killing effects of summer.

The control adjustment is made with a key which is inserted successively into each of the battery cells, then turned to the proper seasonal setting indicated on the battery top. The adjustment regulates water capacity, increasing it for summer use, decreasing it for winter service.

Other features are Metalex grids for more protection against overcharging; long-life insulation; and G.O.X. material for sub-zero starts. Willard Storage Battery Co.

Circle 29 on page 89 for more data



## Switch for Time Delay Requirements

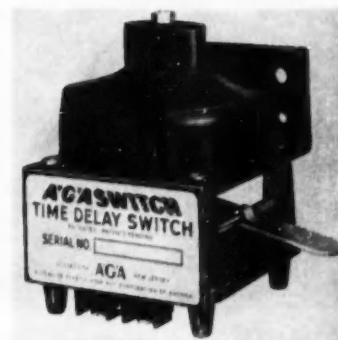
For applications where a mechanically or manually initiated time delay is needed, a unit known as the Aga-switch has been developed. The switch is operated by a lever, rather than by solenoid action. Pressure against the lever trips the switch, and a time delay period from 0.1 sec to five min or more starts upon release of pressure on the lever.

The time delay is obtained by restricting air flow through an adjustable orifice in the timing head. The

timing chamber is enclosed and dust-proof, with air used for timing recirculated inside.

The unit is available in both single-pole, double-break, and double-pole, single-break types, for resistance loads of approximately 15 amp at 115 v, 60 c. It is light in weight and compact, measuring 2½ in. square and three in. high, according to the manufacturer's specifications. AGA Div., Elastic Stop Nut Corp. of America.

Circle 30 on page 89 for more data



## Truck Dump Body for Heavy Hauling

Production of a "rock" type dump body for extra heavy-duty hauling of abrasive materials has been announced. Designed to withstand the hard shock of power shovel, chute and conveyor loading, the unit is available in from five to 15-yard sizes.

Body is said to be constructed of high tensile steel plate and has box-type side bracing on the head sheet and sides.

The body design reportedly eliminates side bulging. Sides fold into floor at a 45-deg angle to prevent material from lodging in corners.

Need for a tailgate is said to be eliminated by use of a 15-deg angle scow type rear end, supported by angular box braces that are an extension of the understructure longitudinally. Galion Allsteel Body Co.

Circle 31 on page 89 for more data



## Brake Fluid Indicator and Dispenser

Recently announced is a brake fluid indicator and dispenser, known as the See-Level. It is claimed that the unit not only shows the level of brake fluid at all times, but serves as an auxiliary master cylinder.

Brake fluid goes into the visible container under the hood of the car. Supply is checked every time the hood of the car is raised. M & H Products.

Circle 32 on page 89 for more data  
(Turn to page 88, please)





# NEW PRODUCTS.

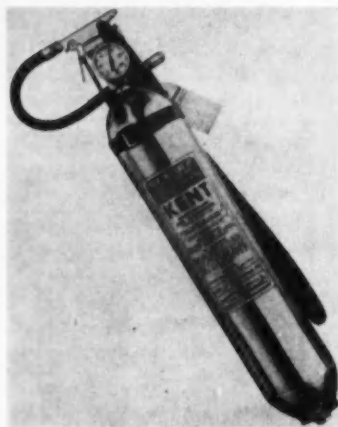
For additional information please use postage-free reply card on page 89

(Continued from page 87)

## Fire Extinguisher

Now on the market is a vaporizing-liquid fire extinguisher that has a simple trigger-action with only one moving part. No pumping is said to be necessary as the unit is operated on stored-pressure.

The unit is aimed like a gun, and the liquid is released by the trigger incorporated into the valve. It is claimed that refilling is accomplished in a matter of minutes.



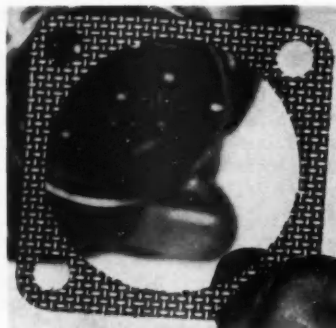
The extinguisher has a brass shell and has been tested at 1800 lb pressure for a safety factor of 18 to 1. A gage incorporated into the unit shows its condition. *Kent Extinguisher Co.*

Circle 33 on page 89 for more data

## Gasketing Material

Recently announced is a highly conductive gasketing material that consists of aluminum wire screening whose interstices are filled with Du Pont neoprene. Both surfaces of the material are buffed to insure uniform gage and smoothness, and to expose the aluminum wire so that it will make good electrical contact with the flanges.

The gasketing is intended primarily for mounting electrical equipment in automobiles and aircraft, and for general use in electronic equipment. The



good electrical conductivity of the aluminum wire is said to permit static electricity to drain through the gasket.

In addition to its conductivity, the material reportedly has two important advantages — dimensional stability and resistance to deterioration. It can be supplied either in the form of cut gaskets or as uncut sheets 19 in. long and 15 in. wide. Thickness as now supplied is 0.02 in. *Vulcanized Rubber & Plastics Co.*

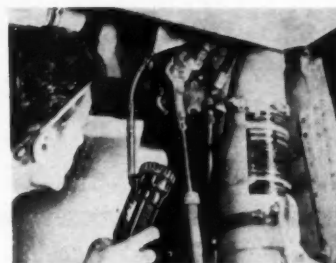
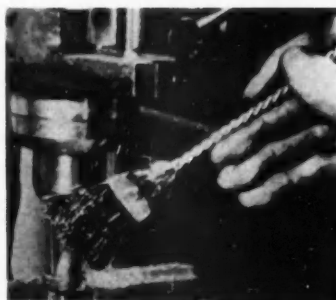
Circle 34 on page 89 for more data

## Chip Brush

Now on the market is a chip brush for cleaning machine work and applying lubricants. Its horsehair bristles are said to resist acids and alkalies common to cutting oils and lubricants.

Bristles are securely held between twisted wires and are trimmed to provide proper degree of stiffness for good operation. *Biltwell Brush Co.*

Circle 35 on page 89 for more data



## Industrial Flashlight

Now available is an industrial flashlight, known as Duo-Flex, with a built-in dual lighting system to provide a probe-light for pinpoint inspection of inaccessible parts and equipment. It has both a 1000-ft flashlight beam and flexible slide-out cable with bulb and plastic guard.

When side-arm is extended, light is automatically transferred to the small bulb, and the extension tube encased in the arm can be goosenecked around corners or into remote spots. The overall extension of the probe-light arm measures 10½ in. *U. S. Electric Mfg. Corp.*

Circle 36 on page 89 for more data



## Gear Bar Breather

Recently announced is a breather for engine crankcases, gear boxes, fuel tanks, hydraulic systems and similar applications. It is said to increase dust filtration capacity and minimize back pressure through special design of the filter element.

Available in ¼-in. to two-in. pipe sizes, the breather reportedly utilizes a new-type element for high efficiency. *Crenlo, Inc.*

Circle 37 on page 89 for more data

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USE THIS POSTCARD

## FREE LITERATURE

### Metal Cleaning

Recently released is a 12-page brochure on the Alkalume process for preparing aluminum, magnesium, and hard-to-clean steels for welding and other finishing operations. *Northwest Chemical Co.*

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### Barrel Handling

Now available is an eight-page booklet entitled "The Logistics of Barrels" which details many cost-cutting methods of fast handling of barrels and barrel "shapes" by power industrial trucks. *Elwell-Parker Electric Co.*

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### Chrome Carbide

Now available is a technical report (CC-100) on Grade 608 cemented chrome carbide, powdered metal that is highly resistant to corrosion and erosion. *Carbology Dept., General Electric Co.*

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### Product Data

Ready for distribution are two new booklets. The first describes how the company's products are made, sold, and serviced, while the second concerns customer comments on its gages. *The DoAll Co.*

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### Bearing Surface Coating

Now available is a brochure on Sprabond Wire self-bonding metallizing material for providing long-wearing bearing surfaces. *Metallizing Engineering Co., Inc.*

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### Bus Duct Switches

Bulletin BD-755 describes Plug-In BUStribution duct, while Bulletin No. SS-250 deals with a line of Vacuum Break Master safety switches. *Bull-Dog Electric Products Co.*

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### Weldments

Fresh off the press is a 16-page bulletin on weldments and the company's facilities for making them. *Struthers Wells Corp.*

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### Casting Machine

Bulletin No. 103 describes the 650-B die-forge casting machine. *Lewis Welding and Engineering Corp.*

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### Fork Lift Truck

Bulletin No. 1344 describes the Gas-O-Matic electric-transmission fork lift truck. *Baker-Raulang Co.*

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PRODUCTS

8/1/53

### Grooving Tool

Catalog No. GT 2-53, fresh off the press, covers the Truarc grooving tool. Facts, figures, charts, and illustrations demonstrate how the equipment can be employed to best advantage. *Walden Kohinoor, Inc.*

Circle 10 on postcard for free copy

### Test Chambers

Bulletin L1150-2 illustrates and describes a line of temperature altitude and relative humidity test chambers. *Bowser Technical Refrigeration Div., Bowser, Inc.*

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### Stainless Steel Bars

Now available is a 28-page booklet on stainless steel bars. Included are reference tables on sizes and shapes available, weights and corrosion resistance and other important elements. *Allegheny Ludlum Steel Corp.*

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### Heat Transfer

Now available is a new house organ published to disseminate engineering information on existing and new heat transfer installations. *Young Radiator Co.*

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### Inclinable Presses

Catalog No. 58L illustrates and describes a line of inclinable presses equipped with mechanical sleeve clutches. *Niagara Machine & Tool Works.*

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### Shot Peening

Ready for distribution is a booklet on shot peening applications. *Metal Improvement Co.*

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### Universal Grinder

Catalog K-53 describes a universal and tool grinder. *Landis Tool Co.*

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### Centrifugal Pumps

Bulletin W-300-B4 covers a line of standard end suction centrifugal pumps. *Worthington Corp.*

Circle 17 on postcard for free copy

### Friction Clutches

Recently released is an engineering data sheet (Form S31-53) describing and illustrating a line of Torque-Limiting slip-type friction clutches. *Morse Chain Co.*

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### Electrical Fittings

Catalog No. 53 covers a line of solderless wire connectors and specialized electrical fittings. *Buchanan Electrical Products Corp.*

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### Beryllium Products

Now available is a 20-page booklet on beryllium products, including the pure metal, oxide and alloys. *The Beryllium Corp.*

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### Support Clamps

Now available is a manual covering a line of support, wire harness, and multiple support clamps and related items. *Thomas Associates.*

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### Washers—Stampings

Now available is a brochure on various washers and metal stampings. *Quadriga Manufacturing Co.*

Circle 22 on postcard for free copy

### Economic Study

Currently available are reprints of an article entitled "The Great Mistake of Karl Marx," which appeared in the May 15 issue of this publication. *Automotive Industries.*

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### Waste Treatment

Book No. 2440 covers equipment for sewage treatment, water purification, and waste treatment. *Link-Belt Co.*

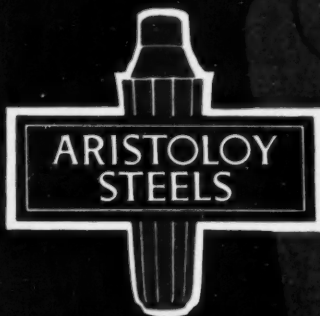
Circle 24 on postcard for free copy

### Traveling Cranes

Now available is a booklet on a line of overhead electric traveling cranes. *Bedford Foundry & Machine Co.*

Circle 25 on postcard for free copy  
(See preceding page)

USE THIS POSTCARD



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# NEW



## AIRCRAFT PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

### Electronic Continuous Fire Detector With No Moving Parts

Now on the market is an electronic continuous fire detector for aircraft.

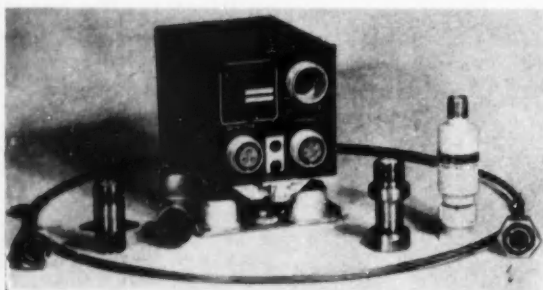
The detector has no moving parts. It consists of a control box containing

two electronic tubes and a special sensing element. Current flows through the control box and out into the wires within the sensing element.

The wires, separated by a ceramic, are enclosed in a .065-in. Inconel tube. Each wire is ungrounded and open-ended so that resistance is infinite.

Heat from a fire will raise the temperature of the ceramic, changing it from an insulator to a conductor of electricity. This closes the detector circuit, setting off warning signals. *Walter Kidde & Co., Inc.*

Circle 26 on page 89 for more data



*Kidde fire detector.*

### Honeycomb Structural Material

Readily available is a structural material now being marketed under the trade name of Aircomb.

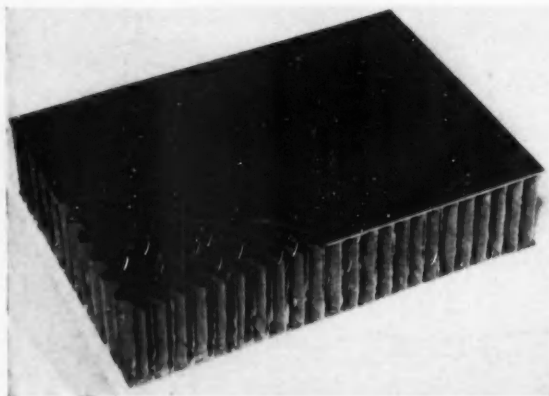
The product is a honeycomb structure of Kraft paper impregnated with a phenolic resin. In use, it is sandwiched between thin facings of aluminum, stainless steel, magnesium, wood, plywood, plastics, or a whole host of other materials. It is shipped pre-cut in any thickness from 1/16 in. to five in. and in any length.

The material is said to be durable, fire and pest resistant, and it has

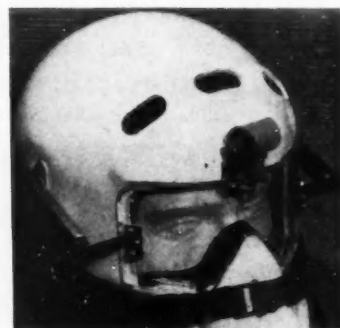
good insulation and soundproofing qualities. In aircraft, it is used for storage cabinets, partitions, floors and panels, interior doors, baggage racks, all types of tables, and cabin ceilings.

In addition, for the military, Aircomb is used to build guided missile fins, wings for robot aircraft, cargo containers, cargo pallets, arctic shelters and radar van trailers. It is also reported by the manufacturer to be suitable for a number of industrial uses. *Douglas Aircraft Co., Inc.*

Circle 27 on page 89 for more data



*Douglas honeycomb structural material.*



*Douglas slotted helmet.*

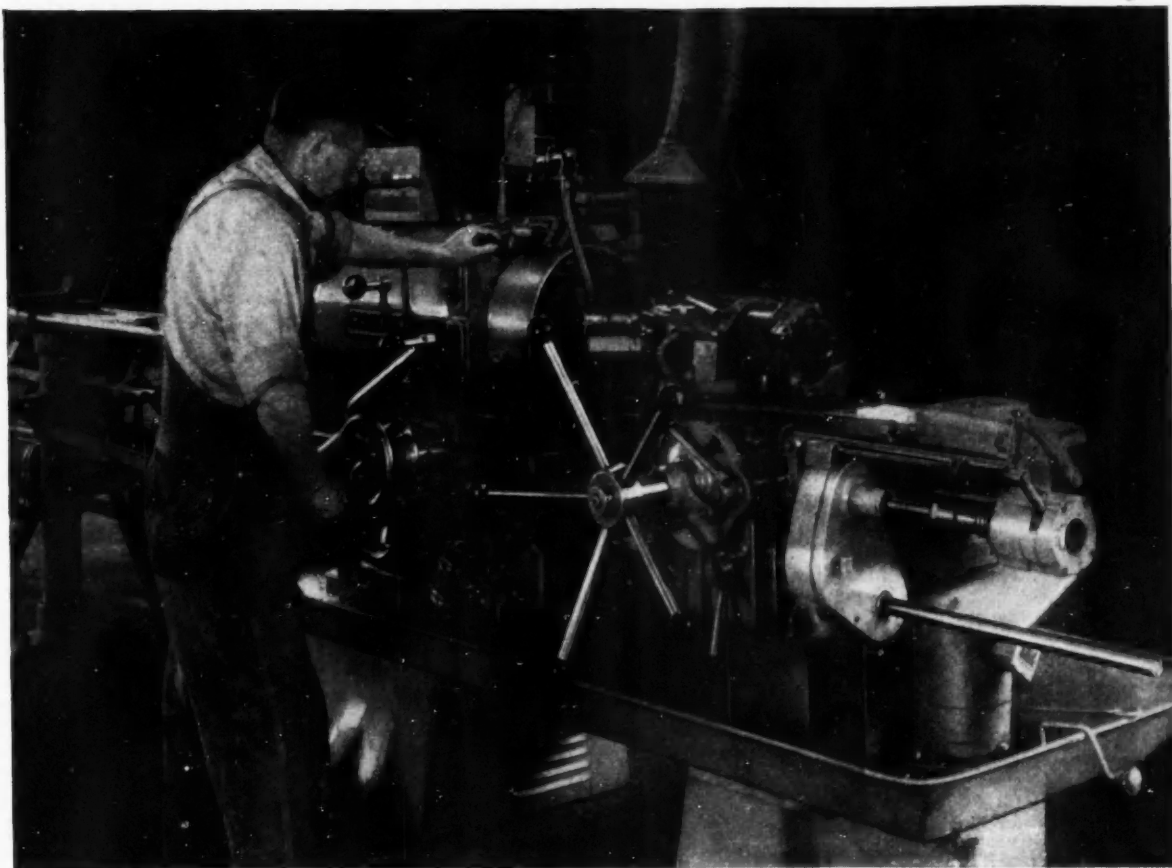
### Slotted Helmet

Development of a slotted helmet designed to protect pilots forced to bail out from their aircraft while traveling at supersonic speeds has been announced.

It is claimed that the slots or vents, which are cut into the forward crown section of the headgear, greatly reduce wind shock and air lift and keep the helmet secure to the pilot's head.

In the present experimental stage each helmet must be designed and fitted to the individual pilot. *Santa Monica Div., Douglas Aircraft Co.*

Circle 28 on page 89 for more data



## MACHINING FOR GOLD at Homestake



### with Gisholt Turret Lathes

Yes, gold mining means machinery. And here at the famous Homestake Mine at Lead, South Dakota, Gisholt Turret Lathes help to machine the machines that dig for gold. It's a big job, too—turning out the variety of rock bits and drill rods that are used up in large numbers.

This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used to machine and thread three sizes of forged steel drill rods. Besides all this, the Gisholt has the job of facing and chamfering the chuck, or shank ends, of the drill steel so that a perfectly flat face is hit by the drill machine tappet.

Here, again, Gisholt Ram Type Turret

Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

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COMPANY

Madison 10, Wisconsin



THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

# METALS

*Price of Tin Lowest Since 1950. Cost of Zinc Remains Unchanged But May Advance. Copper Wire Prices Reduced.*

*By William F. Boericke*

## **Lead in Strongest Position in Non-Ferrous Group**

In the non-ferrous metal industries lead producers have solid ground for optimism for the second half of the year. Zinc producers have reason to expect improvement in the present depressed price for their metal. Tin producers, of which there are none in the United States, are definitely unhappy. Copper producers have their fingers crossed. That's the situation in a nutshell.

Definite improvement is seen in the lead situation. Demand has been good during the normally slow summer months. Pressure of excessive imports is being lifted as Europe once more begins to buy lead. Premiums have been offered in London for prompt delivery. It seems evident that excess lead stocks abroad have been liquidated.

Imports of lead in April totalled 50,750 tons, down slightly from the monthly average for the first quarter of the year. It is likely that later reports will show considerably lower figures. A shutdown for repairs at a major smelter for several weeks has cut domestic output and innumerable suspensions of small zinc mines have eliminated their by-product lead output as a market factor.

Shipments of replacement batteries continue to increase seasonally and totalled 1,435,000 units in May with the biggest demand ahead. Use of tetraethyl lead in gasoline caused consumption of 146,700 tons of lead last year, double the use five years ago.

## **Zinc Demand Excellent but Price Unprofitable for Producers**

Early last March the price of zinc fell to 11 cents per lb, which represented a decline of 8½ cents from its peak of 1952. Since then the price has remained unchanged in spite of heavy imports, which averaged nearly 56,000 tons per month for the first four months of 1953, or substantially more than the rate of production from domestic mines.

A period of over four and a half months of stalemate for the zinc price while its running mate, lead, has been advanced five times, strengthens belief in the trade that the next move will be upward. The 11 cent price is unprofitable for domestic zinc mines, and suspension or curtailment of output has been general throughout the country. While the Reciprocal Trade

legislation was passed without the rider embodying the sliding scale tariff on lead and zinc, the latter is still far from a dead issue and it is entirely possible that it will be rewritten and will come up again after the Congressional recess.

Zinc statistics for June fail to reflect any decline in smelter output because of lower mine output and show production of 81,600 tons for the month, compared with a monthly average of 80,100 tons in 1952. Consumption, measured by shipments, continues at the high level of 76,700 tons, about 2000 tons per month more than the average last year. Stocks of slab zinc in the hands of smelters were 97,300 tons at the end of June, a small increase over May but not alarming.

In short, everything is fine in the zinc industry but the price. Demand for high grade metal from the die-casting industry is very satisfactory. Galvanized sheets which were in supply in June and moving slowly have suddenly become tight, caused in part by demand from the farmers to build additional storage capacity for the big wheat crop.

Less pressure is coming on the market from London and early in July the British Ministry of Supply was selling prompt zinc at a premium of 5/8 cents per lb over the quotation for the July position on the London Metal Exchange. Sales of zinc from government-owned stocks in London are no longer feared as a major market factor.

## **Tin Price Skids**

Two years ago tin sold at \$1.84 per lb in New York and brought on a Senatorial investigation over alleged gouging of American consumers by foreign producers. In mid-July this year the price had dropped to 83 cents per lb, lowest since 1950 and a 55 per cent decline from its peak. Comparatively, tin has suffered more than any other major metal in the world markets.

Without much doubt an 83 cent price for tin is unprofitable for all but the lowest cost producers, yet there is no indication that the present world overproduction, estimated at 50,400 tons excess over consumption in 1952, will be rectified without Government control and setting up of quotas. Neither expedient is likely to find approval in Washington. In the meantime, substitution of other metals and plastics for tin continues. Washington has contracted with Malayan and Indonesian tin producers to take a portion of their output, for the stockpile, at \$1.18 per lb for the next two years, but will offer no more than the world price at time of delivery to Bolivia. Unless stockpiling is resumed here and abroad the price of tin may remain

*(Turn to page 130, please)*

# Lincoln



# Mercury

One of the many leading engine manufacturers to select and distribute Perfect Circle's 2-in-1 chrome piston ring set for authorized replacement service



**2-in-1** is the truly modern piston ring equipment, controls oil,—seals compression for over twice as long as old style sets. Solid chrome protects both oil rails and top compression rings against wear. And only 2-in-1 offers a choice of spring pressures with each oil ring to meet any cylinder wear condition.

**For sustained power** and positive oil control for thousands of extra miles, always install Perfect Circle 2-in-1 piston ring sets. Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

# Perfect Circle

**PISTON RINGS** The Standard of Comparison



# Observations

By Joseph Geschelin

## Top Dollar

According to reports in Detroit newspapers early in July, engineers as well as UAW stewards were getting the top dollar at Kaiser aircraft. An interesting example is that of a hustling UAW steward who, according to the AF audit, was earning \$18,000 a year—with overtime. In an interview with a *Detroit Free Press* reporter, this enterprising steward said that his pay as an engineer had been around \$10,000 yearly, and \$14,000 with overtime. That was before he became a steward. As a steward, with greater responsibilities to the workers, he had to accelerate his pace to the tune of \$18,000 a year.

## Copper Short?

We see by the papers that the British government is planning to sell some 70,000 to 75,000 tons of copper in August out of the "huge copper stocks held by the Ministry of Materials." About 100,000 tons will be retained as an "emergency reserve." Apparently, the good old USA is the only place where copper has been in short supply, so much so that the critical nature of the situation is still fresh in our minds.

## Problem Parts

The June issue of *Drop Forging Topics* has a supplement on the subject of "Problem Parts" tailored specifically for the metallurgist. It is in the form of a problem attack chart, indicating the characteristics of closed die forgings and how they may be applied to solve specific problems. While it is designed to sell forgings, the treatment is restrained and technical and should be of value to the metallurgist and designer as well.

## Automatic Computers

Although calculating machines are

too complex to describe in condensed form, their application has been growing in the automotive industries. Designers of aircraft and aircraft components would be lost without these giant brains that make hash of intricate mathematical problems that would take many men, weeks or months to get the same solution. The simpler equipment is of equal value to designers of motor vehicle components, particularly on problems dealing with crankshaft analysis and other calculations involving vibration, etc.

## Supercharger Development

It is of interest to engine designers that the Miehle-Dexter Supercharger Div., Racine, Wis., is now in full swing on the production of what was formerly the B-W supercharger line. It is important to note that this organization is completing installation of modern engine testing equipment and intends to embark on an ambitious program of development leading to a wider and better use of supercharging.

## Hot Extrusion

Hot extrusion, one of the most promising developments in steel processing, is in production today at the Allegheny Ludlum Watervliet plant. Among its major advantages are: greatly simplified production of seamless steel tubing; production of some shapes not readily rolled or available only by machining; and the ability to make small lots without exorbitant tooling costs. Based on French patents, the process uses glass to lubricate the hot steel during extrusion.

## Machine Tool Standards

Writing in the June issue of *Standardization*, Tell Berna, general manager, National Machine Tool Builders' Association, outlines some

of the basic projects now engaging the technical committee of the NMTBA. One of the recent projects was a revision of the standard on machine tapers. Other standards deal with terminology, and a standard on surface roughness, waviness, and lay. In a broader category, the Association is working on standards dealing with details of machine design, not merely to assure interchangeability but to assure greater safety of operation and to facilitate maintenance.

## Road Light

A new development has come to our attention in connection with headlighting. At least two independent parts companies are seriously considering the manufacture of automatic headlamp dimming devices which would be in competition with the Autronic eye. If their claims are good and if the price is right, they may capture the interest of independent car producers.

## Hot Spray

Painting with hot lacquer or synthetic enamel has had some widespread adoption in the automotive industries, starting from scratch only a few years ago. Late last year Reo adopted hot spray as standard paint practice. Recently we visited an important body plant and learned that they are planning to adopt the technique before the year is out.

## Plastic Dies

Like many other dramatic developments, the use of Rezolin plastics for sheet metal dies is expanding slowly while more information is developed concerning its possibilities as well as durability of the material in long run production. But we see evidence constantly that more and more companies are experimenting with Rezolin in an effort to reduce die cost as well as overall production cost.



## Another First for Thompson

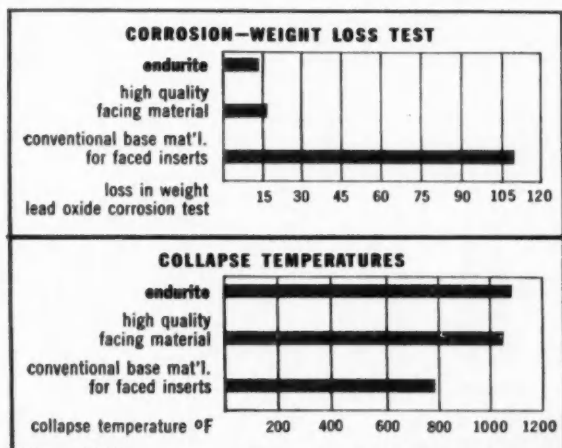
Thompson, which pioneered in the development of super-hard, heat resisting alloys for valve seat inserts now has engineered a new, even better valve seat material—*Endurite*.

Endurite has all of the properties of the best heavy duty valve seat facing materials *plus* superior lead corrosion resistance *plus* superior resistance to insert seat collapse or loosening.

Seats made of Endurite stay tight in the cylinder head or block and also permit more regrinds, since Endurite is not used as a facing only. The *entire* seat is Endurite.

If you have a valve seat insert problem in your gasoline, diesel or propane engine, write or phone Special Products Division, Thompson Products, Inc., 2196 Clarkwood Road, Cleveland 3, Ohio.

These charts indicate Endurite superiority over other types of materials used in valve seat insert manufacture.



You can count on  
**Thompson  
 Products**

SPECIAL PRODUCTS DIVISION

# News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Continued from Page 39

## United Specialties to Expand Output

United Specialties Co. has arranged for \$670,000 financing in addition to \$830,000 currently borrowed from Mutual Life Insurance Co. of New York. United Specialties has concluded an agreement with Mutual Life for a \$1.5 million 15-year 4 per cent mortgage loan to cover the financing.

The funds will be used to complete and equip a 30,000 sq ft addition to the Chicago plant to expand output of air cleaners now being produced on a three shift six-day basis. Production of television parts also will be doubled.

The company reports a large increase in sales for the nine months ended May 31, totaling \$14.28 million and profits of \$390,573 compared with sales of \$9.6 million and profits of \$289,300 for the same period a year ago.

## Caterpillar to Build New Plant at Decatur

Caterpillar Tractor Co. has decided to build its new plant at Decatur, Ill., for production of motor graders and industrial wheel tractors. The company has acquired a 340 acre site and will start construction of the 700,000 sq ft plant immediately. A large retooling and rearrangement

## ROCKETS OFFSHORE

Col. Joseph M. Colby, of the Ordnance Procurement Center, Heidelberg, Germany, is shown discussing the rocket which will be produced by the Societe de Mecanique de la Seine, of Paris. Raymond Thoby, director general of the firm, holds the rocket.



program will be carried out at the Peoria and other Caterpillar plants for increased production of crawler tractor and Diesel engine manufacturing at Peoria, made possible by the new Decatur facilities.

## ASTM Annual Meeting

The 1953 annual meeting of the American Society for Testing Materials featured 34 sessions and included 565 meetings of the technical committees. Registered attendance was 2472. Sixty-three new specifications and tests were approved.

Leslie C. Beard, Jr., assistant director of Socony-Vacuum Laboratories, Socony-Vacuum Oil Co., Inc., was elected president for 1953-1954,

succeeding H. L. Maxwell, technical adviser, engineering department, Du Pont, who continues on the Board of Directors as Past-President for three years. C. H. Fellows, director, Engineering Laboratory and Research Dept., The Detroit Edison Co., Detroit, Mich., is the new vice-president.

## Delpark Extends West

Industrial Filtration Co., Lebanon, Ind., has announced that the Delpark industrial filters will be manufactured and marketed by the DeLaval Pacific Organizations on the West Coast. Manufacturing will be handled by the DeLaval Turbine Pacific Co. It is a related activity of DeLaval Steam Turbine Co.

## REGIONAL SALES OF NEW PASSENGER CARS

Zone	Region	May 1953	April 1953	May 1952	Five Months		Five Months		
					1953	1952	May over April	May over May 1952	Five Months 1953 over 1952
1	New England	33,769	33,332	26,211	136,516	100,615	+ 1.31	+26.84	+35.41
2	Middle Atlantic	101,887	97,101	82,682	433,912	322,756	+ 4.93	+22.93	+34.44
3	South Atlantic	65,996	54,917	46,986	270,885	205,579	+20.17	+40.46	+31.77
4	East North Central	143,586	135,973	105,484	611,664	443,619	+ 5.61	+36.13	+37.86
5	East South Central	24,232	25,224	19,044	111,808	80,343	- 3.93	+27.24	+39.29
6	West North Central	55,927	54,115	40,254	232,591	189,711	-12.77	+38.94	+37.05
7	West South Central	47,967	40,428	36,431	212,967	153,591	+10.72	+31.75	+38.67
8	Mountain	17,046	19,235	13,340	79,178	56,655	-11.37	+27.72	+37.99
9	Pacific	59,121	57,952	51,577	249,366	183,149	-13.51	- 2.82	+36.16
Total—United States		540,575	528,278	422,217	2,339,000	1,716,220	+ 2.33	+28.03	+36.23

States comprising the various regions are: Zone 1: Conn., Me., Mass., N. H., R. I., Vt.; Zone 2: N. J., N. Y., Pa.; Zone 3: Del., D. C., Fla., Ga., Md., N. C., S. C., Va., W. Va.; Zone 4: Ill., Ind., Mich., Ohio, Wis.; Zone 5: Ala., Ky., Miss., Tenn.

Zone 6: Iowa, Kan., Minn., Mo., N. D., S. D.; Zone 7: Ark., La., Okla., Tex.; Zone 8: Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo.; Zone 9: Cal., Ore., Wash.

# STERLING'S NEW CONFORMATIC

PISTON

## THIS STEEL TENSION MEMBER

Maintains fitting  
clearance from  
-20° F. to 200° F.



Can Be Safely Fitted  
to **LESS** Clearance  
... Without Danger of  
Scuffing or Seizing

You get quieter engines, eliminate cold slap and reduce friction... without sacrificing piston strength or conductivity. No cold slap at temperatures as low as -20° F... no seizing or scuffing at 200° F.

LOOK AT THESE TEST RESULTS . . .



## RESULTS OF 1200 Hour CYCLE TEST

In recent cycle tests made by one of the largest automotive manufacturers, Sterling Conformatic pistons were fitted into a stock engine at .0005 clearance. After operating the engine for 1200 hours, approximately half of that time at full load and full throttle, the Conformatic Pistons were pronounced perfect.

# STERLING

STERLING ALUMINUM PRODUCTS, INC. • St. Louis, Missouri



# One Broaching Machine Does Four Operations on Single Part

**A**N ingenious setup at the Caterpillar plant in Peoria, Ill., permits four different broaching operations to be performed continuously on track roller shafts, using only one broaching machine. A production rate of 63 track rollers per hour, totaling 252 operations, is achieved through unified broaching with fixtures, broaches, and Dual Ram broaching machine furnished by Colonial Broach Co., Detroit. Two operators load, unload, and handle the parts.

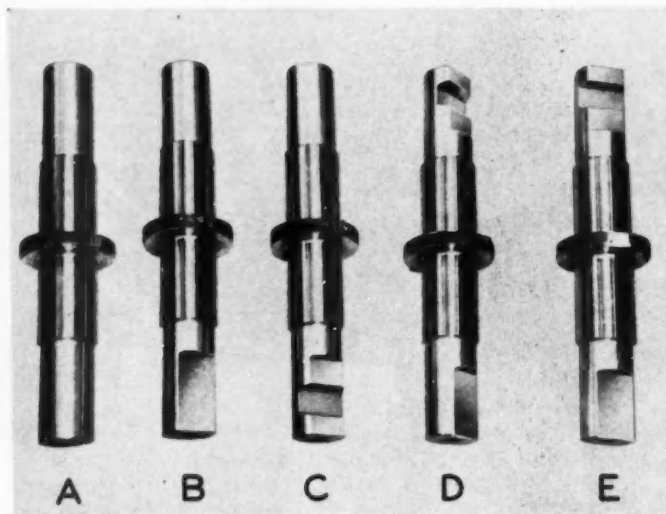
There are two stations for the left hand ram, and two for the right. The same sequence is shown from left to right in the illustration of the parts. The forging is 18.375 in. long with 2.500 in. finished diameters on the ends.

The operator mounts the machined forging in the left hand fixture, locating from forged lugs on the central flange. In this first station, a flat is broached 0.400 in. deep and 3.554 in. long on one end of the shaft. In the adjacent station, an angular notch is broached in the flat. This notch is 1.388 in. wide and 9/16 in. deep.

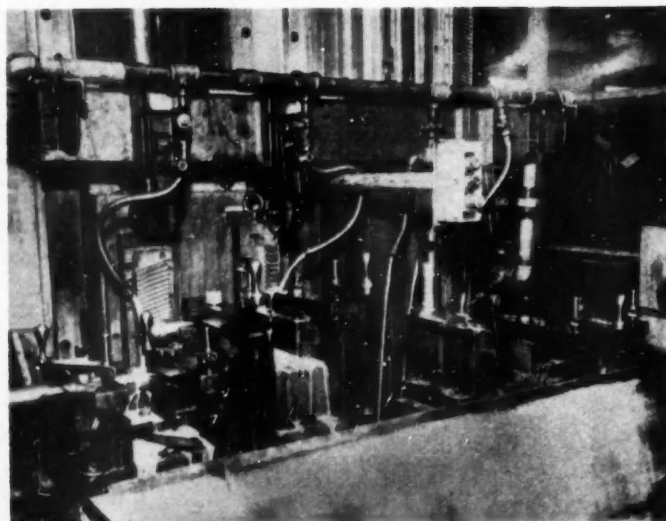
In the next station, a flat is broached on the opposite end having the same depth and length, and in the same plane as the first flat. At the last station, the roller shaft is placed vertically in the fixture, using the broached end as a locator, and the locating lugs are removed by the broach.

The stations for the right hand ram are loaded while the left hand ram is broaching and vice versa. This is made possible by the receding motion of fixture tables.

The track roller shaft shown is one of two different track roller shafts broached on the same setup.

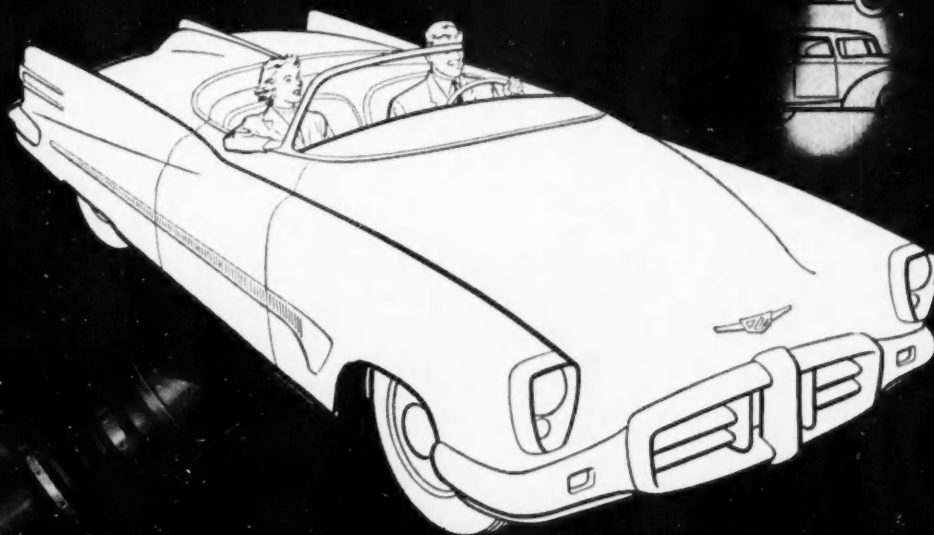


Caterpillar track roller forging (a) at left as it comes to the broaching machine. Other parts show sequence of the four broaching operations from left to right, as follows: (b) broach flat, (c) notch flat, (d) broach flat on opposite end, (e) remove flange lugs.



Closeup of the Dual Ram showing tooling for the four operations. Sequence is from left to right.

As Time Goes By . . .



... "DETROIT" Sets the Pace  
for Universal Joints

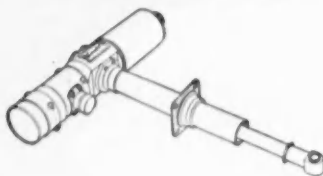
America's leading cars—thoroughbreds of the road—have come a long way since the first "one-lunger". During this progress, the continual step-up of engine power has increased tremendously the burdens placed on universal joints. Improvements in "DETROIT" Universal Joints have kept pace with car and truck design to help America's vehicle manufacturers achieve products of vision and initiative.

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## Airborne Actuator for the Sturdy Savage



Tiny but essential—that's the LINEATOR® Electric Linear Actuator. Huge but handy—that's North American's new XA2J-1 Savage. Combined, they do a job for the Navy.

The R-144 M16 Lineator is used as the actuator in a temperature control system furnished by Airborne. Other models and similar Airborne electromechanical units are standard equipment in many Service and civilian aircraft. You'll find data on Lineators and other Airborne actuators, motors and ANGLgears in the Engineering Catalog of the Institute of the Aeronautical Sciences. We invite inquiries.



**ACCESSORIES CORPORATION**

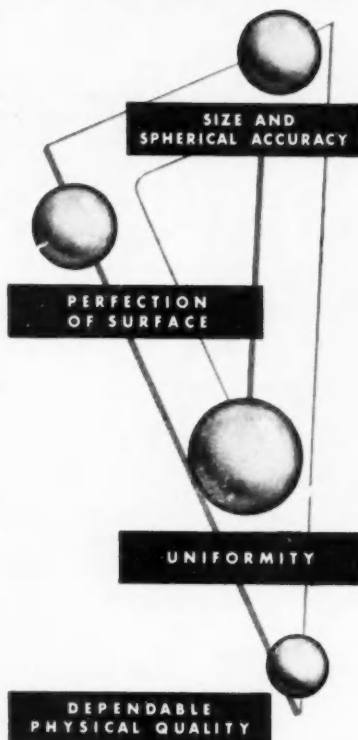
1414 Chestnut Avenue  
Hillside 5, New Jersey

## CALENDAR

OF COMING SHOWS AND MEETINGS

- "Autorama"—Int'l Automobile Exhibition, 1890-1953, Million Dollar Pier, Atlantic City, N. J. Aug. 1-Sept. 15
- SAE International West Coast Meeting, Georgia Hotel, Vancouver, B. C. .... Aug. 17-19
- Western Electronic Show & Convention, Civic Auditorium, San Francisco, Calif. .... Aug. 19-21
- National Aircraft Show and 50th Anniversary of Powered Flight, Vandalia Airport, Dayton, O. .... Sept. 5-7
- Society of British Aircraft Constructors' Display, Farnborough .... Sept. 7-13
- SAE National Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee, Wis. .... Sept. 14-17
- Truck Body & Equipment Ass'n annual meeting, Sheraton-Gibson Hotel, Cincinnati, Ohio. .... Sept. 21-23
- Eighth National Instrument Conference and Exhibit, Chicago, Ill. .... Sept. 21-25
- SAE National Aeronautic Meeting, Hotel Statler, Los Angeles, Calif. .... Sept. 29-Oct. 3
- American Inst. of Electrical Engineers Aircraft Technical Conference, Benj. Franklin Hotel, Seattle, Wash. .... Sept. 30-Oct. 2
- Paris Salon, France .... Oct. 1-11
- 35th International Motor Show, Earls Court, London .... Oct. 21-31
- SAE International Production Meeting, Royal York Hotel, Toronto, Canada .... Oct. 29-30
- American Society of Tool Engineers, semi-annual membership and board meeting, Dayton Biltmore Hotel, Dayton, O. .... Oct. 30-31
- SAE National Transportation Meeting, Conrad Hilton Hotel, Chicago, Ill. .... Nov. 2-4
- SAE National Diesel Engine Meeting, Conrad Hilton Hotel, Chicago, Ill. .... Nov. 3-4
- Third Transport Aircraft Hydraulic Conference, Park Shelton, Detroit, Mich. .... Nov. 3-4
- SAE National Fuels and Lubricants Meeting, Conrad Hilton Hotel Chicago, Ill. .... Nov. 4-6
- Montreal Materials Handling, Tool and Industrial Equipment Shows, Show Mart, Montreal, Que. .... Nov. 9-13
- American Society of Mechanical Engineers, annual meeting, Statler Hotel, New York, N. Y. .... Nov. 29-Dec. 4
- 1954**
- SAE Annual Meeting, Sheraton-Cadillac Hotel and Hotel Statler, Detroit, Mich. .... Jan. 11-15
- National Motor Boat Show, Bronx, N. Y. .... Jan. 15-23
- National Transport Vehicle Show and Fleet Maintenance Exposition, New York, N. Y. .... Feb. 17-19
- SAE National Passenger Car, Body, and Materials Meeting, Hotel Statler, Detroit, Mich. .... March 2-4

from any angle



# STROM

is your  
**BEST BALL BUY**

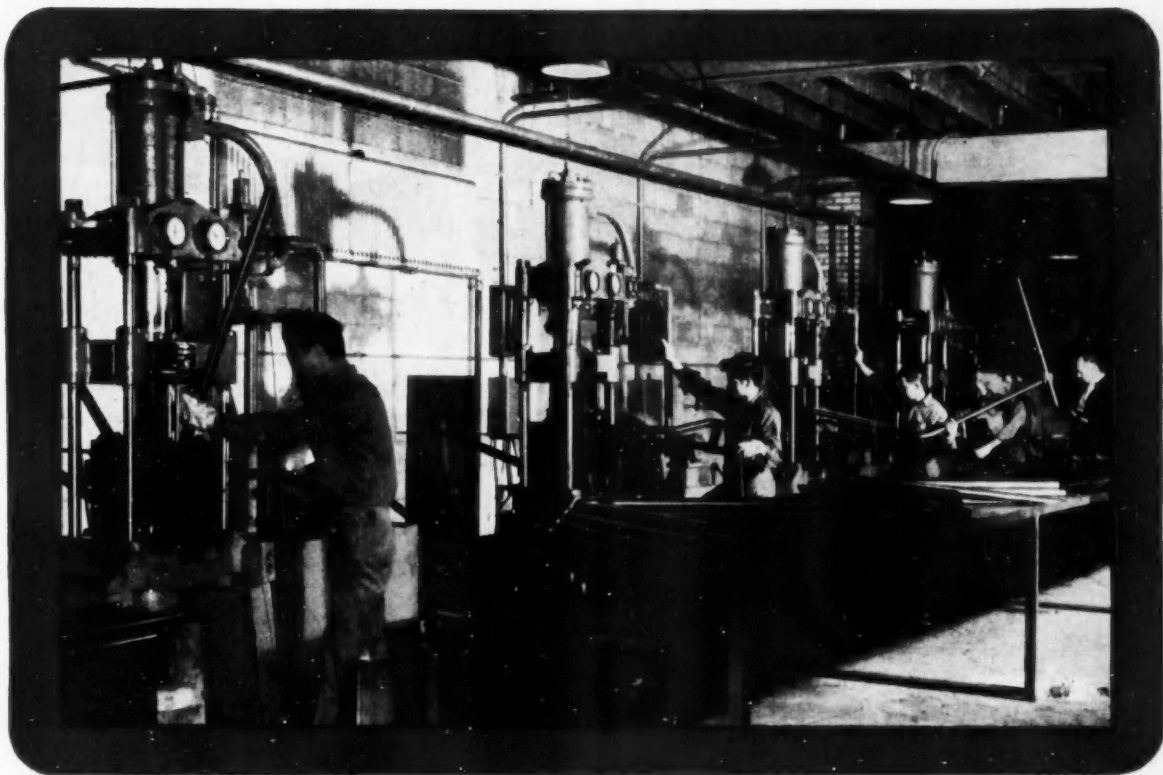
If you have a metal ball problem, why not let Strom solve it for you. Whether for precision ball bearings or for one of many other ball applications... Strom will supply the *right* ball to meet your requirements. For more than a quarter century, industry has looked to Strom for metal balls of unsurpassed quality.

# Strom

## STEEL BALL CO.

Largest Independent and Exclusive  
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## BENDING TUBING INTO TAILPIPES...

another job done better, faster  
on **ELMES** Hydraulic Presses!

Four 20-ton hydraulic tube benders—one of many types of Elmes Presses built for special metalworking jobs—are shown above in operation at James Steel and Tube Co., Hazel Park, Michigan. Automobile tailpipes, each requiring seven bends, are produced at the rate of 2000 complete units per eight-hour shift.

These small but heavy-duty, high production Elmes Presses are designed especially for bending tubing into automotive exhaust and tailpipes. Their performance has been so outstanding—affording substantial savings

in time, effort, maintenance and money—that they are now widely recognized as the logical "first choice" among presses used for this application.

Whether your metalworking press requirements call for special purpose designs, or can be met with standard production equipment, you'll find it always pays to "put your pressing problems up to Elmes." Many others have found it profitable . . . in terms of gaining *press performance at its best!* Ask Elmes engineers to assist you. Recommendations and cost estimates supplied promptly.

American Steel Foundries

**ELMES ENGINEERING DIVISION**

METAL WORKING PRESSES • PLASTIC MOLDING PRESSES • EXTRUSION PRESSES PUMPS • ACCUMULATORS • VALVES • ACCESSORIES



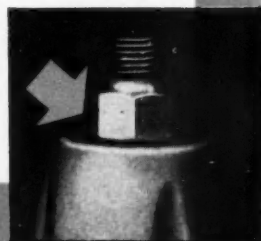
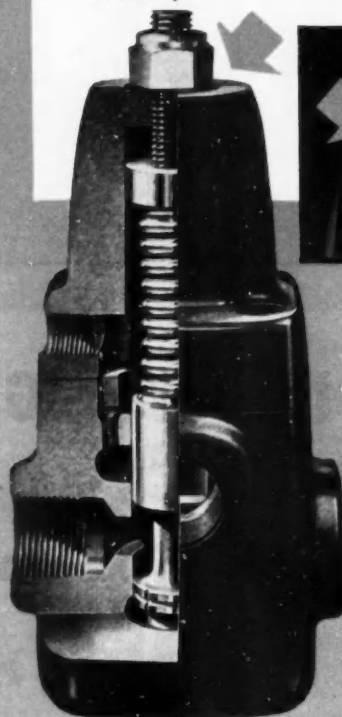
**Precision Dyna-seal  
plays vital role  
in leak-proof  
operation of this  
Hydraulic  
Relief Valve**

Rivett Lathe & Grinder, Inc., uses a Precision Dyna-seal in order to simplify the construction of this Balanced Piston Hydraulic Relief Valve. Simple to install and maintain, the valve must give long, leak-free service. The Precision Dyna-seal plays a vital part in the valve's efficient operation at 1500 P.S.I.

Everyone is finding Precision Dyna-seals the simple answer to many sealing problems. No grooves—all you need is a flat surface to seal under bolt heads, rivet heads, cap nuts, flanges, special fittings, etc. Suitable for service with petroleum products, water, many other fluids and gases. Precision engineers will help you — and proper deliveries will keep your production lines going. Please send us your inquiries now.



Synthetic rubber sealing member bonded to steel ring for sealing circular flat surfaces — no grooves necessary!



**FREE**—Write for your personal copy of our Dyna-seal engineering data booklet.

**Precision Rubber Products**  
**CORPORATION**  
**"O" Ring and Dyna-seal Specialists**

**Dept. 5, Oakridge Drive, Dayton 7, O.** Canadian Plant at: Ste. Thérèse de Blainville, Québec

## Tubeless Tires as Factory Equipment on Passenger Cars

**J**UST about a year ago there was considerable speculation that the tubeless tire would be found on 1953 passenger cars as standard equipment. Although this did not materialize there appeared to be a strong possibility that 1954 models would kick off this striking development.

AUTOMOTIVE INDUSTRIES has just completed a survey of prospects for 1954. At the time we went to press there appeared to be conclusive evidence that tubeless tires are not yet ready for this season and that no industry trend in this direction is indicated for the start of 1954 production. Naturally, this does not rule out the possibility that some one maker might decide to offer tubeless tires on a higher priced model to test public acceptance.

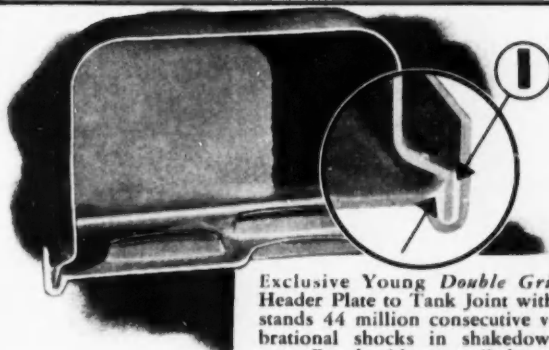
Meanwhile, a number of things have happened to disturb the natural course of events. In the first place, at least several of the major tire producers feel that in the present state of development they cannot produce tubeless tires at costs that would be attractive to car manufacturers by comparison with conventional tire equipment. It is obvious that increased costs at the factory might be a bar to acceptance at this time on the part of many car manufacturers.

A recent newspaper release quoted Dr. A. W. Bull, U. S. Rubber Co., tire development director, as saying that tests so far have not yet established a clear advantage for replacing present tire equipment with tubeless tires as a matter of standard equipment. In addition, Dr. Bull cited several minor problems which can be licked but require further study.

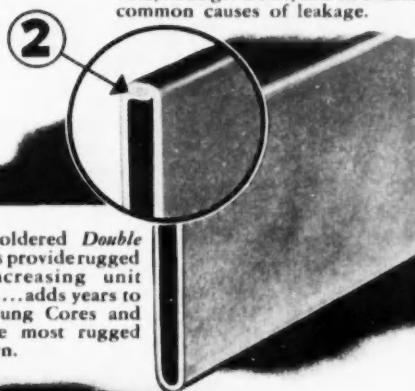
Added to these temporary and minor blocks is the problem posed by the filing of a patent infringement suit by B. F. Goodrich against Firestone Tire & Rubber Co. According to press reports Firestone answered the allegation by stating "There is no merit in the tubeless tire patent suit. Firestone tires do not infringe Goodrich patents." Nevertheless, the existence of a patent suit may well cause delay in the general adoption of tubeless tires since, generally speaking, the car manufacturers have insisted that all major producers must have a complete range of tubeless tires on the market and in service establishments before the new tire can be considered for standard equipment.

Meanwhile, the tire companies have been supplying a large volume of tubeless tires of various types for the retail market in various areas and are thus gaining valuable service experience. Similarly, the car manufacturers have been continuing their road work and testing so as to accumulate data on which to base

## 3 POINTS to Specify...Watch... When Buying Radiators



Exclusive Young *Double Grip* Header Plate to Tank Joint withstands 44 million consecutive vibrational shocks in shakedown tests. Fused with controlled temperature hot solder to produce sure, stronger bond, and eliminate common causes of leakage.



Young fully-soldered *Double Lockseam* Tubes provide rugged backbone, increasing unit strength 100%...adds years to the life of Young Cores and Radiators. The most rugged structure known.



Accurately flanged tube openings in Young fins assure positive joining and maximum heat transfer at all times between primary tube and secondary fin surfaces. Specially corrugated fins increase and control air turbulence and cooling effect.

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# YOUNG

Heat Transfer Products for Automotive, Agricultural, Industrial, Gas and Diesel Engine Applications  
Heating, Cooling, Air Conditioning Products for Home and Industry

Leaders in Heat Transfer Engineering for more than 25 years

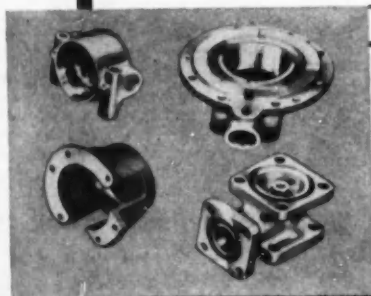


## Off on a Carefree Vacation!

He just contracted with Vinco to produce component parts.

This confidence in Vinco is typical of many manufacturers from coast to coast. They have learned that whether the parts to be produced have close or loose tolerances, these parts will be delivered as specified, at a minimum cost and with a minimum of scrap.

**VINCO CORPORATION**  
9117 Schaefer Hwy.  
Detroit 28, Mich.



Mass Produced Parts  
Gears  
Gear Pumps  
Spline Gages  
Aircraft Gears

# VINCO

MILLIONTHS OF AN  
INCH FOR SALE

THE TRADEMARK OF DEPENDABILITY.

recommendations at the proper time.

There still remains the problem of adequate air-sealing of rims for wire wheels. Indications are that the wire wheel producers are confident that spoke attachment to the rim can be adequately worked out when the time comes.

Despite the probability that there will be no industry-wide trend to tubeless tires for 1954, there remains the likelihood that one or more of the higher-priced, low volume cars may find it desirable to add this feature on a 1954 model. In any event, it is a situation well worth close attention.

## Bendix Power Steering

(Continued from page 69)

simplest and most direct way as straightline motion to the steering linkage of the vehicle.

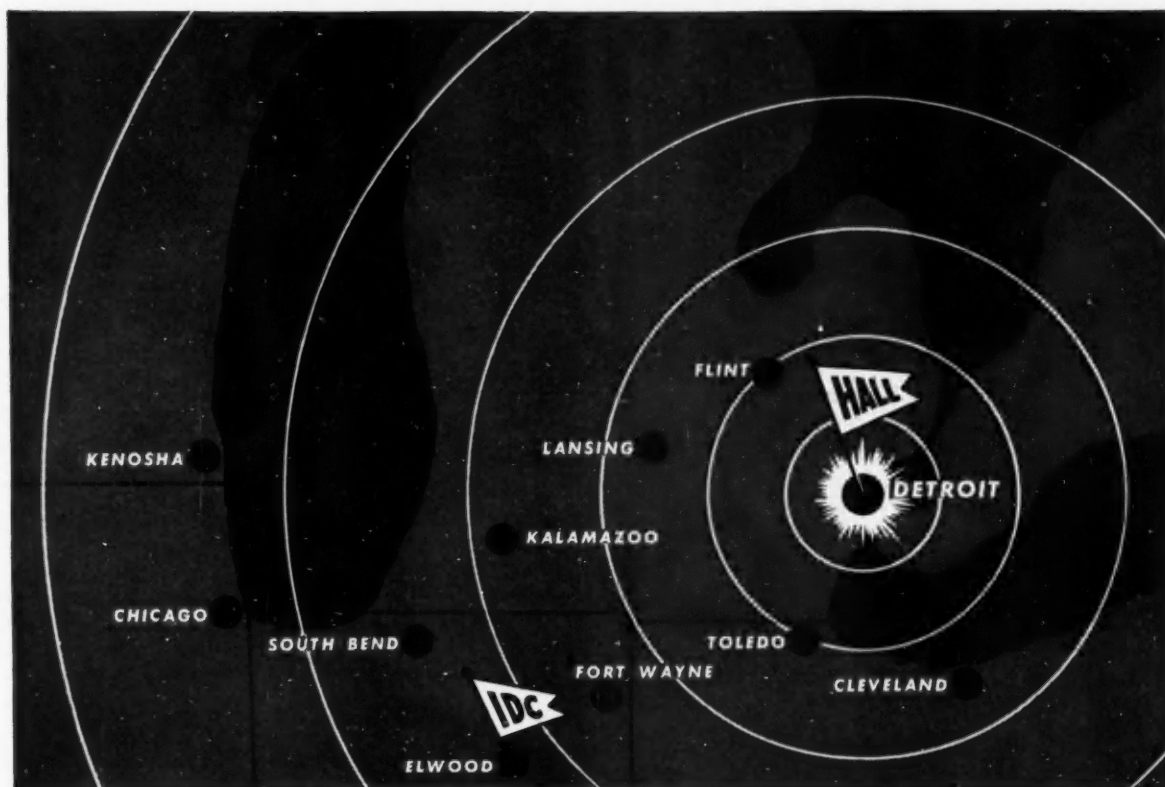
The control valve of the two-unit type installation which is being currently used on passenger cars, is mounted at one of the ball joints, usually at the Pitman arm. A small movement in the valve serves to open and close hydraulic ports, to operate the double-acting power cylinder.

An alternate type unit combines the control valve with the power cylinder. This gives even a simpler and more compact installation, where surrounding design permits.

Either the composite single-unit type or the two unit type with the separate control valve can be used, whichever best suits the space and placement conditions of the individual vehicle. Normal operation of the steering gear and system by physical effort is not interfered with in any way if the engine is not running and there is no hydraulic pressure.

In operation, a reaction force is set up in the control valve proportional to the hydraulic pressure in the valve and in the power cylinder, tending always to return the valve to neutral position for straight ahead steering. This also gives the driver a natural "feel" of the steering force being exerted and prevents over steering.

If desired, the control valve can be furnished with centering springs which spring load the valve in the neutral position. This has the effect of increasing the physical force required before power steering begins if this is desired in the individual application.



## Bright-Spot in the Transportation Center

DETROIT'S high-speed automotive production lines make split-second supply and immediate service absolute necessities.

The C. M. HALL LAMP COMPANY is the bright-spot at the hub of this vital industry . . . the only complete manufacturer of lighting equipment so centrally located for both supply and service.

Time after time customers have expressed their "thanks" for the all-inclusive service

C. M. HALL provides for them. Costly shut-downs are avoided as the C. M. HALL LAMP COMPANY gears to everchanging schedules.

C. M. HALL LAMP COMPANY, with its subsidiary, INDIANA DIE CASTINGS, INC., manufactures over 200 different kinds of transportation lights. Since 1909 we have worked hand-in-hand with the leaders of the industry to develop new and better lighting . . . to improve America's VISION FOR TRANSPORTATION.



*Vision for Transportation*

1035 EAST HANCOCK AVENUE

• DETROIT 7, MICHIGAN

and its wholly-owned subsidiary INDIANA DIE CASTINGS, INC. ELWOOD, INDIANA



## Trailer Coach Industry

(Continued from page 59)

trailer industry with their products can be gained from the table on page 56.

Although no automobile manufacturer is presently engaged in trailer manufacturing, there is evidence that some of the major car companies have from time to time explored the possibility. In all probability, none of them has gone into trailer manufac-

turing because, while mass-production techniques are employed wherever feasible in the industry, the volume and nature of trailer production is not such as to lend itself particularly well to the high-capacity manufacturing processes so native to the automobile industry. As has been seen above, however, the trailer field does offer to automotive suppliers.

among others, a fair-size market which is being (and can be still further) tapped.

In view of the almost inescapable road-imposed limitations of eight ft wide and 14 ft high, the trailer coach has been able to expand in only one direction—lengthwise. Expansion in length is just what has been going on, too, for in 1952, 74 per cent of the mobile homes sold were 30 ft or longer, compared with 64 per cent in 1951 and only 17 per cent in 1948. The average today runs around 35 ft with a predicted trend to 40 ft. A few mammoth coaches have been built that run 45 ft and up, but these are mainly special purpose jobs.

The lengthening of trailers has unquestionably been an improvement that has aided to a considerable extent the inclusion of many design and construction features that were not possible in earlier, stubbier models. This increase in length has, however, not been without its attendant problems for the owner. Although a light car in good mechanical condition can haul a 30-ft trailer without much difficulty, a medium-to-heavy car is needed for anything bigger, even when heavy-duty springs are used. As a result, some owners hire a trucking company to haul their trailers from place to place.

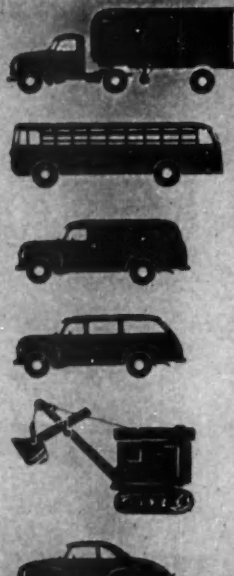
The trend to longer trailer coaches has also brought about conflict with a welter of widely different state limitations on the length of the coach or the length combined with a car. These various regulations may range from 45 ft to no limitation on combined length, and from 33 ft to no limitation for the length of the coach. This is a problem that the industry is working on constantly in an effort to obtain some degree of uniformity among laws and standards governing trailer coaches.

## Trailer Parks

Many motorists will recall that an unfortunate plurality of the trailer colonies in existence before and during World War II were rather unsightly blots on the landscape with pitifully inadequate and often unsanitary facilities that caused frequent outbursts of community resentment. This situation, naturally, presented a serious threat to an industry whose well-being is keenly dependent on the goodwill of the public. TCMA examined the problem after the war and came to the conclusion that an active program must be undertaken to encourage the development of new "trailer parks." It has since campaigned vigorously for parks

for over  
**70**  
YEARS

**TUTHILL**  
has solved many equipment  
problems requiring special  
**SPRINGS**




Since 1880 Tuthill has specialized in designing springs to fit every specific need. Whether your spring requirements are for trucks, buses, automobiles, power shovels, farm wagons or dual and triple axle heavy-duty jobs—Tuthill can meet them quickly and economically. And now, MOLYBDENUM DISULPHIDE (MoS<sub>2</sub>) . . . the newest Tuthill extra that keeps springs from *squeaking* and *galling*, is an added Tuthill feature that distinguishes this famous line.

Whatever your spring requirements may be — see Tuthill first!

**TUTHILL SPRING CO.**

760 W. POLK ST.,  
CHICAGO 7, ILLINOIS



**Wire wheel inserts are dressing up  
many of the 1953 models**

*—of course they're Stainless Steel*

**W**IRE wheels are one of the "hot items" in the automotive trade this year. Car owners like the distinctive look they give, and they are available for almost any car in the form of inserts like the one shown here.

As on so many other decorative members, straight-chromium Type 430 Stainless Steel is being widely used for wire wheels. Stainless Steel is strong yet light in weight; it resists corrosion; it's easy to keep bright and new-looking.

These qualities of Stainless Steel—so popular with owners—are the main reason why there's more straight-chromium

Stainless on the 1953 models than ever before.

New finishing facilities have helped to speed the switch to Stainless Steel for all types of exterior and interior trim. U·S·S 17 (Type 430) Stainless Steel, used extensively for these applications, is furnished in strip form with a bright mill finish that requires minimum polishing after forming, as well as in wire and other forms.

For the best performance, insist on U·S·S Stainless Steel. Our representatives will be glad to work with you in selection of materials and forming methods that best meet your design requirements.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO  
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

**U·S·S STAINLESS STEEL**

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS



9-1608

**UNITED STATES STEEL**

# METAL EDGE

pays packaging dividends  
in 3 typical industries

## CUTS SHOCK DAMAGE TO INSTRUMENTS!

"Wooden boxes often broke, but M.E. boxes have the 'give' to absorb bumps, and strength to protect our regulators. Best of all they save us 50% on packaging and labor costs."

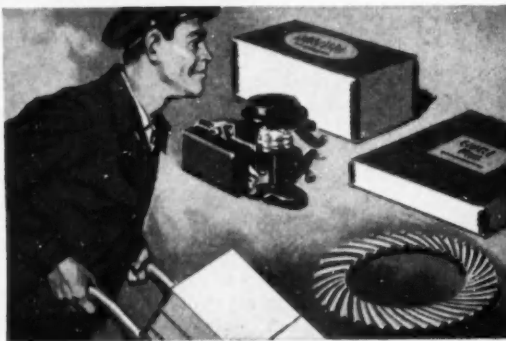


## INCREASES DISTRIBUTION!

"Many dealers refused to carry all our pulley sizes because of difficulty in stocking unpackaged items. Now we use M.E. boxes, and dealers have substantially increased their inventories."

## PROTECTS HEAVY-WEIGHT PRODUCTS!

"Sturdy M.E. boxes enable us to ship spare and replacement parts the safe way... eliminate box breakage complaints... dealers like 'fresh-box' appearance."



**METAL EDGE—the engineered method—has solved diverse packaging problems in over 100 American industries.**

## NATIONAL METAL EDGE BOX CO.

PACKAGING • MATERIALS HANDLING • INVENTORY CONTROL

346 North 12th Street, Philadelphia 7, Pa.



that would be assets, rather than liabilities, to communities.

As a result, a well-planned modern trailer park resembles a pleasant suburban town in itself. Each homesite has a paved area on which the trailer is parked, underground water and sewer connections, paved streets, and oftentimes a community building with sanitary, laundry, and recreation facilities. An average rental of \$15 to \$25 a month is charged for space, while transients may pay as low as \$1.00 a night.

The number of parks in the U. S. is estimated by some manufacturers to be in the neighborhood of 12,000, double the number in operation only two years ago. It should be noted, however, that this figure includes every type of park from mere vacant lots to the de luxe operations with swimming pools, shopping centers, television lounges, etc. It is reasonable to say that there are approximately 4000 parks which meet approved TCMA standards for layout, sanitation, and general appearance.

There is little doubt, however, that construction of new trailer parks is proceeding at the rate of about 1000 a year. Florida alone has over 1500 parks, while California is said to have accommodations for about 100,000 coaches. Perhaps one of the largest trailer colonies in existence today is near the site of an atomic-energy project at Paducah, Ky., where it was last estimated that 8100 persons were housed in 2544 coaches.

Total investment in trailer parks in the U. S. today is deemed to be close to \$250 million. This sum is not surprising when one stops to consider that the cost of establishing a trailer park with approved facilities is approximately \$1000 per trailer site. This figure includes cost of driveways, sewer, water and electrical facilities, utility buildings, and other required structures and facilities, but not the cost of the land itself.

In keeping with the feeling in some industry quarters that retired people, whose percentage rating in the U. S. population is steadily growing, are due to assume an increasingly more important status in the market for trailers as time goes on, a number of trailer parks have been established which cater to this class. The Bradenton Trailer Park, Bradenton, Fla., for example, has 1100 lots filled almost entirely with coaches occupied by retired persons. The occupants, whose average age is 65, come from all walks of life, from former policemen and clerks through doctors and lawyers. The facilities which they enjoy

(Turn to page 114, please)

# Facts you should know about Kearney & Trecker's Special Machinery Division

► If you're a potential buyer of special machines or special tooling — read about our expanded facilities

**THOUGH** we've been designing and building standard and special machine tools since 1898, limited production facilities for special machines previously prevented us from offering these services on a wide scale.

But now, our Special Machinery Division has new and greatly expanded facilities. Its exclusive job will be to build special machine tools and tooling or specially to adapt standard equipment to solve specific metalworking problems.

## Check our qualifications:

**EXPERIENCE:** We've been in the business 55 years. In addition to being one of the country's leading producers of standard milling machines . . . our production of special machinery has ranged up to \$3,000,000 annually.

**FACILITIES:** The new Special Machinery Division plant, built on a 38-acre site, is equipped with more than \$2,500,000 worth of new tools and equipment.

**PERSONNEL:** The Special Machinery Division engineering section has nearly 100 experienced design and production engineers at its command. These men specialize in applying to metalworking the latest developments in mechanics, hydraulics, electronics, metallurgy and allied fields. In addition, it has a full complement of experienced machinists and mechanics needed for special machine construction.

**PERFORMANCE:** Kearney & Trecker's Special Machinery Division is best recommended by its record of successfully solving hundreds of unusual machining problems. These include high production requirements as well as exacting dimensional accuracies and surface finishes.

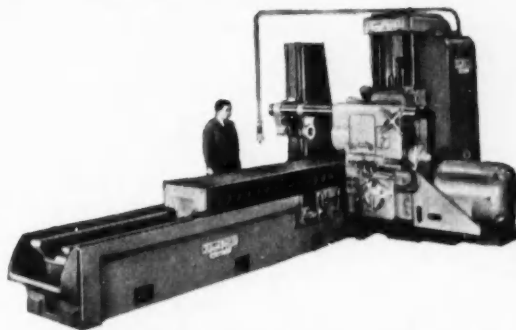
**RESPONSIBILITY:** Our Special Machinery Division is an integral part of the Kearney & Trecker Corporation . . . and is fully supported by all its financial, physical and personnel resources.

Any commitment for a product of this division is a commitment that fully involves the accepted reputation for responsibility and satisfaction that is Kearney & Trecker's.

## We invite your inquiry

We'll be glad to provide you with any information we can . . . including sample machine specification sheets on typical installations, a brochure covering the expanded facilities of our Special Machinery Division, and details on our Customer Engineering Service. Furthermore, if you have special production machinery problems, have one of our senior Project Engineers analyze them, without obligation, of course.

Write, wire or phone the Special Machinery Division, Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.



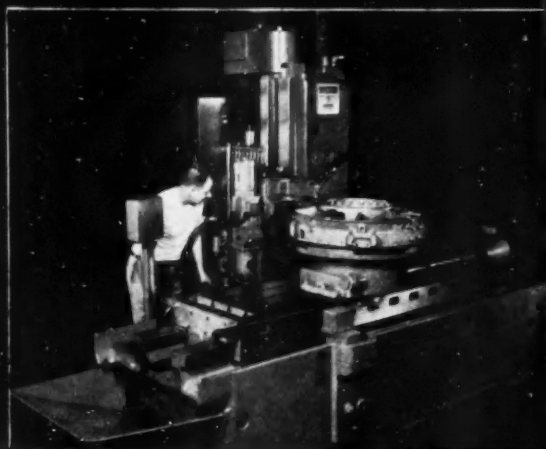
We've built special machines or adaptations of standard equipment for practically every industry. Here is a photo of a 50 hp CSM Simplex milling machine we designed and built for a leading manufacturer.





# IF YOU WANT BETTER MILLING METHODS AND LOWER COSTS...

**Use Sundstrand  
Machines and  
"Engineered  
Production"  
Service**

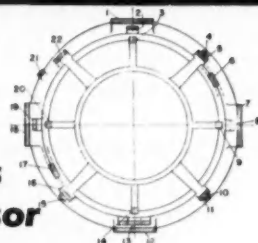


Profitable milling production can be obtained only by lowering unit production costs . . . obtaining the most economical solution to your milling problem and the most productive milling equipment in relation to your production requirements.

Basically, there are two approaches to solving these problems, (1) obtaining standard machines, then trying to process parts over these machines as economically as possible, (2) designing the most profitable processing method, then obtaining machines to suit this method — standard or semi-standard machines, if possible, or entirely special machines, if necessary. This latter method is Sundstrand "Engineered Production" . . . the most practical approach to economical milling. The following is a brief resume of the complete engineering and manufacturing service available from Sundstrand to meet all or any of your production milling requirements in small and medium size work.

These actual examples are presented to reveal one of each of the methods used in solving milling production problems. One of these methods may be the solution to your present problem.

## 1 **Standard Rigidmil Mills 22 Pads On Compressor Frame**



This machine is a standard Model 33 Rigidmil equipped with a power vertical feed attachment, an automatic index base controlled from push button station and an automatic quill positioning device. The quill positioning device can be pre-set for 19 automatic depth settings.

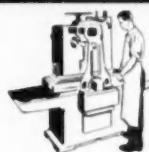
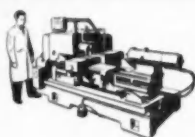
Four different types of cutters are used for the 22 cuts or surfaces machined. The part is located and clamped once but is indexed completely four times with a cutter change at the end of each complete index cycle. To operate the machine, the operator selects the quill position required by the pad presented to the cutter at each index, positions the head vertically by the head jog button and then starts the feed cycle. Table will feed in either direction as required.

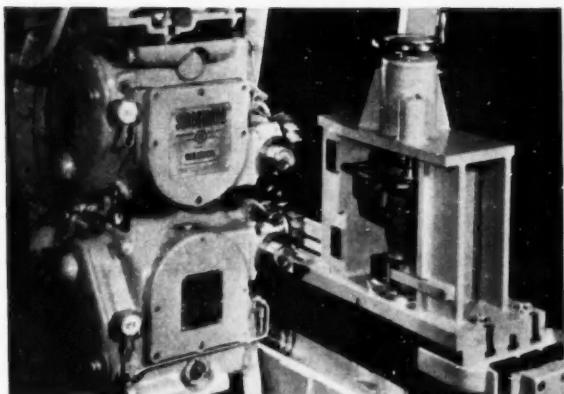


**"Engineered  
Production"  
Service\***

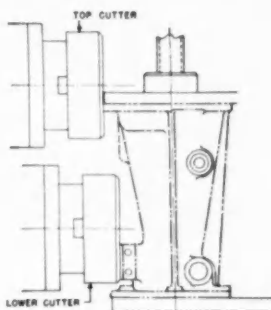
\*REG. U.S. PAT. OFF.

AUTOMATIC LATHES   SIMPLEX RIGIDMILS   DUPLEX RIGIDMILS





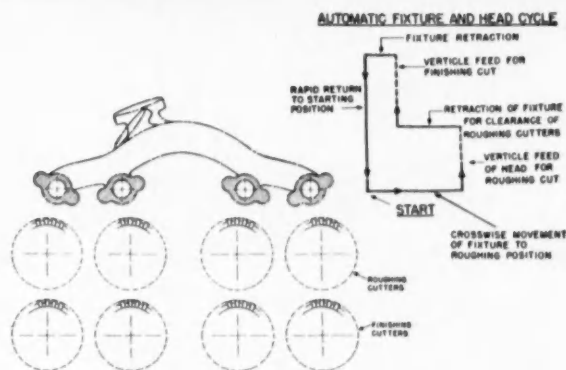
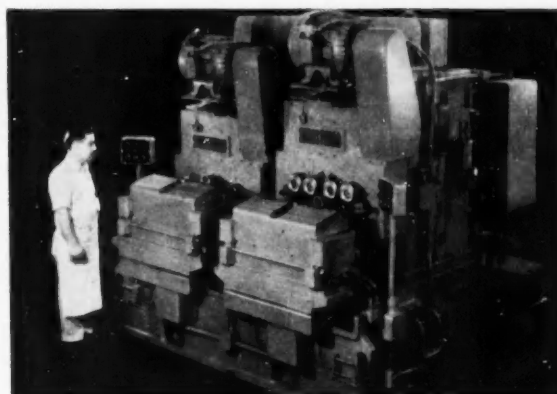
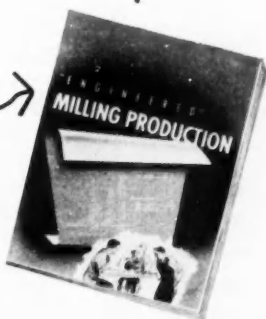
## 2 Milling 2 Pads at 60 Pieces Per Hour On Semi-Standard Rigidmil



This standard Sundstrand Rigidmil has been provided with two horizontal single spindle heads, one above the other. The two spindles are offset for milling a boss and one edge of flange of bearing retainers. A simple, manually operated work holding fixture holds one piece at a time, and an automatic table cycle of rapid approach, feed and rapid return is used to complete 60 pieces per hour. This is a good example of how a standard Rigidmil can readily be converted to handle special milling jobs.

## Free Data

You'll find plenty of milling methods in this book . . . methods that may provide a short cut or profitable solution to similar jobs in your shop now. Tooling diagrams and machine designs are both included. Write for your copy today. Ask for Bulletin No. 234.

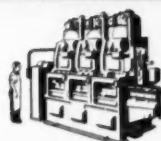
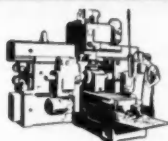


## 3 Milling 135 Manifold Per Hour On a Special Rigidmil

Here is a special two station Sundstrand Rigidmil that rough and finish mills four port contact faces of exhaust manifolds. Each station has eight spindles, the top four roughing and the bottom four finishing. The machine cycle and surfaces milled at one station is shown in the accompanying tooling diagram. In automatic cycle, controlled by the hydraulically operated work holding fixture, the head rapids up, feeds through the rough and finishing cut and rapid returns. Automatic cutter relief is provided by the fixture. Operator loads and unloads at one station while other station is in operation. Production is 135 manifolds per hour.

TRIPLEX RIGIDMILS

SPECIAL MACHINES



**SUNDSTRAND**  
**Machine Tool Co.**

2571 Eleventh St. • Rockford, Ill., U.S.A.

(Continued from page 110)

include shuffleboard and horseshoe pitching courts and a 1200-seat auditorium with a dance floor, card rooms, and other recreational provisions.

Another particularly interesting example of the attention which the retired population is receiving is to be found in Melbourne, Fla. The AIA Trailer Park, named for the highway which runs beside it, is unique in that it is actually a "laboratory" for the study of the problems of retired persons. Undertaken by the Industrial Relations Center of the University of

Chicago, in cooperation with 70 leading industrial employers (among them Republic Steel Corp., General Motors Corp., and General Electric Co.), the park has been set up to aid in defining and evaluating the problems of maturity and to study the reactions of older persons to community living in a trailer park.

The project was launched only recently with 24 trailers set aside for controlled study. They will be occupied by retired couples or couples who will soon be retired. Complete facilities for recreation, hobbies, and

handicraft are being established for the leisure time that each person will have during his stay of several weeks in the park. It should be pointed out that the park is also open on a selective basis to a limited number of younger persons who wish to rent space, as one objective of the program is to maintain a typical trailer park environment.

Studies will be made of the plans, expectations, and adjustments which concern workers before retirement, as well as their living arrangements, recreations, use of leisure time, and the economic problems of retirement. The findings of the research will be used in industry and adult education programs being formulated by the Industrial Relations Center to assist industrial firms to aid individuals in planning and preparing for retirement.

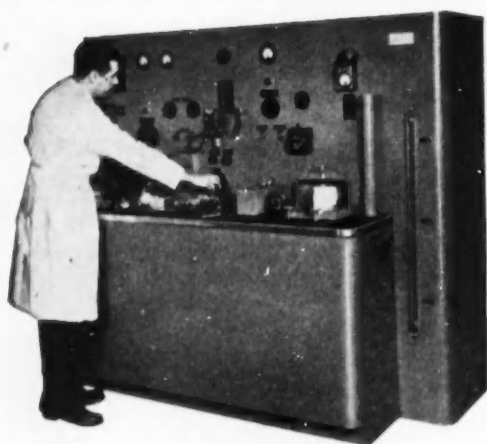
#### Outlook for the Future

The trailer industry, as we have seen, is an extremely dynamic one that has demonstrated a marked ability to meet a demand of almost tidal wave proportions during the past decade. It cannot be denied, however, that a fair share of its lush sales are directly traceable to an abnormally high market engendered by a continuing national emergency. The crying need for emergency housing for defense workers, military personnel, and others has unquestionably figured large in the sales picture for the past 10 years.

The manufacturers of trailer coaches are, on the whole, realistic enough to realize that this "Pollyanna" cannot go on forever. Yet, most of them look forward to the future with confidence, for they know that they have already and are still actively developing vast peacetime markets.

The butcher, the baker, the candlestick maker, the mobile worker, the retired person, the newlywed, and the vacationer are all potential customers for trailer coaches. They should enable the industry to maintain an annual sales volume of at least \$200 million in normal times—not a bad figure for an industry which only a few years ago was an infant in swaddling clothes, but which has now grown to the proportions of a Gargantua.

When all is said and done, it is obvious that the trailer coach is here to stay, for it is a way of life as well as a product. It offers simple, economical housing to those who stay settled and gives mobility to those who prefer to be "at home on the road" with a thousand mail-boxes from coast to coast.



**19**  
**PARTS**  
**TESTED**  
**ON**  
**1 UNIT**

**Problem:**

Design and build test bench to check operation of 19 different electrical mechanical and hydraulic accessories.

**Solution:**

The compact, multi-purpose Nankervis Accessory Test Stand illustrated.

This problem was presented to the Nankervis Company by a prominent manufacturer of military vehicles. Functional operation of the accessories . . . **battery—generator indicator—fuel tank sending unit—bilge pump assembly—lighting control switch—to mention only a few . . .** required many complex electrical and hydraulic circuits besides unique mechanical devices.

The solution to this problem was worked out by Nankervis—resulting in the compact, self-contained test bench illustrated. All 19 accessories are tested on one bench.

When you think of special testing equipment—Why don't you, too, call in a Nankervis representative? He'll show you a better way to do it . . . and at less cost. For more information—Write today.

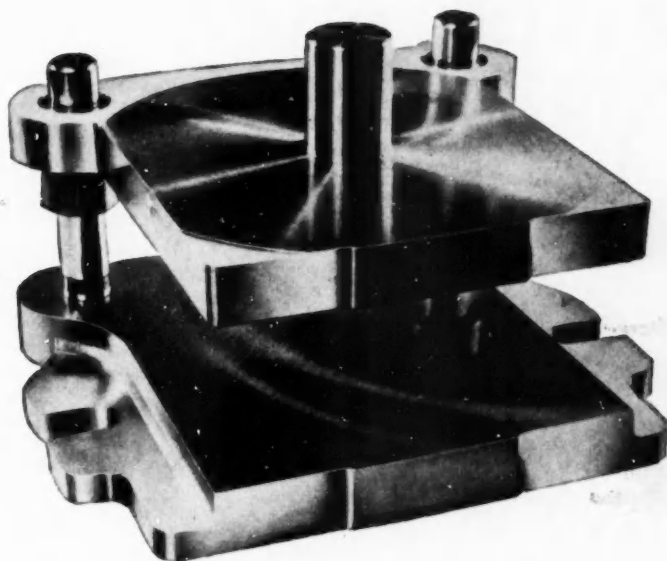
*Nankervis designs and builds all types of special equipment for testing complete engines, hydraulic components, electrical accessories and similar electro-mechanical devices.*

**GEORGE L. NANKERVIS COMPANY**

INDUSTRIAL TESTING DEVICES

19255 W. Davison Avenue

Detroit 23, Michigan



# **DANLY DIE SETS**

## *help build the mighty Cat Diesel Tractor*

You can trace the mountain-moving brawn of the famous Cat-built Tractors right back to the production line . . . and to Danly Die Sets. Caterpillar Tractor Co. uses Danly Die Sets as a precision base for many diemaking operations . . . depends on them to help maintain uninterrupted production schedules.

Danly Die Sets save countless hours in the die shop . . . make tooling-up much faster — easier too. Why not bring

Danly Die Sets into your production picture? . . . get the kind of die performance you're looking for.

Remember — there's a Danly Branch near you.

Service is fast . . . convenient.

**DANLY MACHINE SPECIALTIES, INC.**

2100 South Laramie Avenue, Chicago 50, Illinois



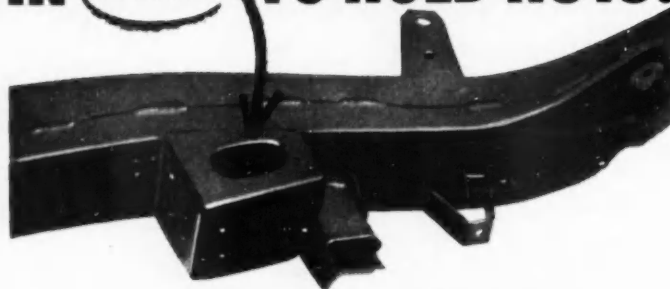
DIE SETS . . . STANDARD OR SPECIAL  
DIEMAKERS' SUPPLIES

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*CLEVELAND 14	1550 East 33rd Street
*DAYTON 7	3196 Delphos Avenue
*DETROIT 16	1549 Temple Avenue
*GRAND RAPIDS	113 Michigan Street N.W.
*INDIANAPOLIS 4	5 West 10th Street
*LONG ISLAND CITY 1	47-28 37th Street
*LOS ANGELES 54	Ducommun Metals & Supply Co. 4890 South Alameda
*MILWAUKEE 2	111 East Wisconsin Avenue
*PHILADELPHIA 40	511 W. Courtland Street
*ROCHESTER 6	33 Rutter Street

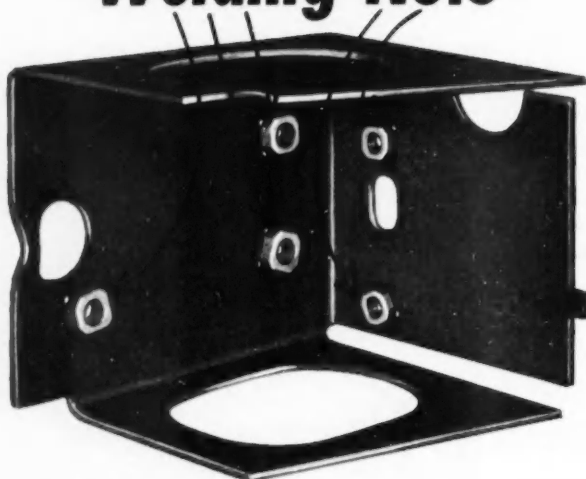
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# IMAGINE TRYING TO GET IN **HERE** TO HOLD NUTS!



## No Problem At All With ... **MIDLAND** Welding Nuts



With Midland Welding Nuts pre-mounted\* in inaccessible places, there is no need to hold the nuts while attaching other parts.

**\*THIS IS ALL YOU DO** — Just insert collar of Midland Welding Nut in hole for bolt or screw, resistance weld the Nut in place, and the Nut is there for the life of the job. Nuts can be fed automatically to the resistance welder.

*Write for facts about these better connections at less cost.*

### The MIDLAND STEEL PRODUCTS COMPANY

6660 Mt. Elliott Ave.

Detroit 11, Michigan

Export Department: 38 Pearl St., New York, N. Y.

#### Manufacturers of

AUTOMOBILE AND  
TRUCK FRAMES

AIR AND VACUUM  
POWER BRAKES

AIR AND ELECTRO-PNEUMATIC  
DOOR CONTROLS

## Chilling Jet Parts

(Continued from page 63)

assembly procedures which illustrate this manufacturer's use of industrial chilling.

Aluminum alloy rotor disks are assembled to aluminum alloy drums with an interference fit of 0.020 in. The hole in the disk is approximately 9.25 in. The disk is oven-heated to 325 F, and the drum is chilled for approximately 15 minutes at -110 to -120 F, after which assembly is easily achieved.

Aluminum alloy peripheral air seals are shrunk into steel retaining rings. Although the part is approximately 23 in. in diameter, only five minutes' time at -110 to -120 F is required to obtain the 0.002 in. interference fit.

Aluminum gland rings are shrunk into cast magnesium flexible couplings. For a 0.002 in. interference fit, the five in. diameter gland ring is chilled for five minutes. Similar time is required to shrink a bronze liner into an aluminum center bearing housing. The same interference is obtained. Many other similar problems are solved in the same way. In general, temperature is -110 to -120 F, time depends on part size and material.

A further use for still another Sub-Zero unit is in the calibration of test cell thermocouples. Engine tests are run at atmospheric conditions and in winter operation, this requires accurate reading of cell temperature. A small chilling unit is used to stimulate winter climate for calibration purposes.

The industrial chilling machines mentioned above are manufactured by Sub-Zero Products Company, Cincinnati, Ohio.

## BOOKS...

**CELLULOSE: THE CHEMICAL THAT GROWS**, by William Haynes, published by Doubleday & Co., Inc., Garden City, N. Y. Price, \$4.00. In this history of fact and legend, the author relates the story of the cellulose industry from the age of Marco Polo to the present, and records the paradoxical and complex qualities of this amazingly useful chemical. It is the tale of such scientific sleuths as Edison, Menard, Cross, and the Count de Chardonnet searching painfully for the identity of this unknown wonder. It is the story of our most modern products and the products of the future—plastics, nylon, lacquers, lethal explosives, and even a cure for ulcers. Included is a concise glossary, a chronology of events and discoveries, and appendices of statistical and technical data.

**NEW!**

# EVANITE

**the only  
battery  
separator  
with all  
these  
advantages!**



Evanite is an improvement over nature! Wood has long been recognized as the most satisfactory low cost separator material. Now the new Evanite *interwoven wood fibre* separator utilizes wood in improved form. Evanite separators, tested in 20,000 batteries in daily use up to three years, have delivered more than their guaranteed battery life without a single separator failure.

Write today for full details on Evanite—Made only by Evans Products Company, Western Division, Dept. P-8, Plymouth, Michigan. Mills at Coos Bay, Ore.; Roseburg, Ore.; Vancouver, B. C.

*Ask your battery manufacturer for complete product and case history information on the advantages of Evanite.*

Uniform high quality—every Evanite separator is identical whether you compare two or two million.

## **Compare These Advantages of Evanite Separators**

**TESTED IN 20,000 VEHICLES** for periods up to 3 years under actual operating conditions.

**OUTSTANDING PERFORMANCE**, equaling or surpassing conventional separators.

**NO SPLITS, NO CRACKS**—Completely uniform. No candling required.

**NO TREATING, NO WET HANDLING**—Treated at the factory and shipped dry.

**CUTS SHIPPING COSTS**—Much lighter than ordinary separators.

**ECONOMICAL**—Cost no more than ordinary treated wood separators.

**BACKED BY EXPERIENCE**—Produced by Evans, whose years of experience are your assurance of finest quality.

**EVANS**

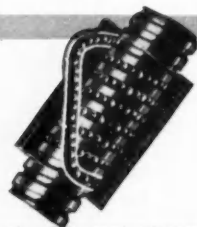
**WORLD'S LARGEST MANUFACTURER**

**OF BATTERY SEPARATORS**

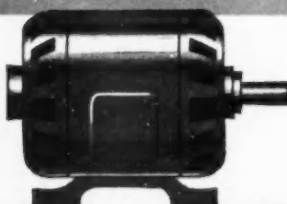


**To MOVE with less EFFORT**

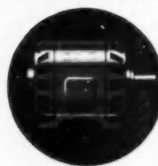
## **BALL-SCREW ACTUATORS**



**REDUCE THIS**



**TO THIS**



If you could take about 80% of the friction out of your moving device, you could vastly reduce the size of motor needed.

Our ball-screw actuator is a combination of the screw (for power) and balls (for friction-free movement).

Many U. S. airplanes have installations of our ball-screw actuators. They have been used to help replace big motors with small ones; to improve control of motion; to eliminate human work required to crank something.

Besides saving weight and reducing the cost of friction—besides providing absolutely smooth motion—besides minimizing need for lubrication—the Ball-Screw Actuator permits the precision control of metal to metal. You can stop on a split micron!

We have expanded our capacity so that we can engineer industrial applications now. Write for booklet describing actuators and their uses.

## **CLEVELAND PNEUMATIC**

**TOOL COMPANY**

DEPT. G-8 • CLEVELAND 5, OHIO

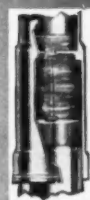
BALL-SCREW ACTUATORS

AIR-OIL SHOCK ABSORBERS

AUTOMOTIVE SHOP EQUIPMENT

## **To CUSHION SHOCK...**

CPT's shock absorber principle combines pneumatic and hydraulic cushioning. It can control minute vibrations or tons of impact. It is the shock absorber for the largest aircraft landing gear (CPT is world's biggest manufacturer of landing gears), but the principle can be adapted to finger-sized units. May we discuss with you how to ease the shock out of stopping or take the motion out of vibration?



**WORLD'S LARGEST MANUFACTURER OF AIRCRAFT LANDING GEARS**

# Latest European Aviation Developments

(Continued from page 62)

class of their own are the gas turbines, the turbo-prop engines and the turbo-compressors of comparatively small horsepower, manufactured by Turbomeca. All jet work is in the hands of SNECMA and Hispano-Suiza, although Rateau has returned to the jet and is now working on the Savoia, details of which have not been released. The former State Arsenal was turned over to private enterprise early this year, and as the SFECMAS, is mainly concerned with research on guided missiles and secret engines. A supersonic Delta-wing aircraft is being developed.

While SNECMA originally produced principally under Bristol license, and is still building the Bristol Hercules, jet engines have been developed nationally. These are the Atar series of axial jets; the one exhibited was the 101F with after-burner, which has a thrust of 8360 lb, for a weight of 2558 lb, and a diameter of only 36 in. This is about to be followed by the 101G, which should have a thrust of 8820 lb. Much work has been carried out on a jet deviator, mounted at the end of the engine tail pipe and used to deflect the exhaust jet from its axial flow. An advantage claimed for this device is that it is possible to pass instantaneously from a positive thrust to a counter thrust. The first objective was a reduction of the landing distance, and it is claimed that this has been reduced from 800 or 1000 yd to 400 yd. Except that there is a grid in the tail pipe which directs the jet as required, and that a single control is brought up to the pilot's seat, not much information is given regarding the deviator. The installation varies with every type of machine and on the Vampire, which was the first to use it, had to be quite special because of the two tail booms.

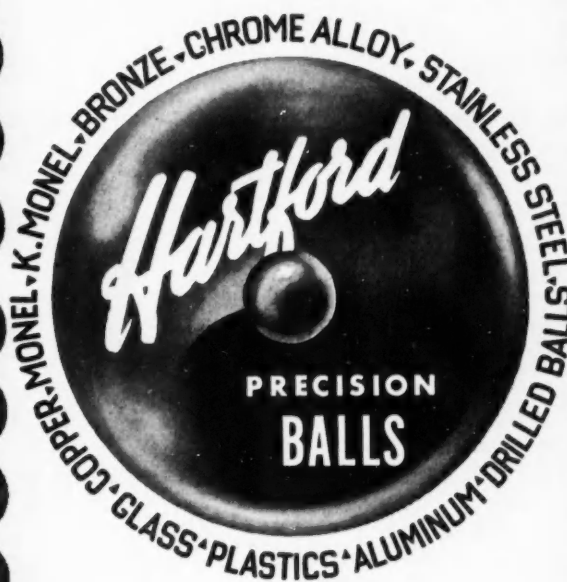
Latest and largest of the SNECMA jets is the Vulcain, which was tested for the first time in May last year and showed a thrust of 9900 lb at ground level, for a weight of 3080 lb. Like the smaller models, it has a seven-stage axial compressor and an annular combustion chamber with 20 injection jets.

While continuing its own type of 1500 hp liquid cooled, 12-cyl engine with direct fuel injection, a centrifugal blower and geared-down propeller shaft, Hispano-Suiza is concentrating more and more on jets built under Rolls-Royce license. The Nene

and the Tay are in serial production and a license has just been taken up for the axial compression Avon. This engine develops 7500 lb static thrust, which is increased to 9500 lb with after-burner. The Tay with after-burner is now in regular production, with an increase of 30 per cent in static thrust at sea level over the standard model. A turbo-pump driven

by air from the main compressor delivers fuel to the after-burner. An automatic hydraulic regulator governs the jet pipe temperature and the operation of the variable-area nozzle. The Hispano-Suiza Tay was used on the Dassault Mystery which recently exceeded the speed of sound. The Avon R.A. 7 will equip the new Mystère 4B, and is also scheduled for

## BALLS FOR BEARINGS AND OTHER BALL APPLICATIONS



Precision balls made for your job — available in a variety of materials. Your specifications will receive prompt attention in our Engineering Department. We are thoroughly experienced in supplying the automotive industry with special bearings, retainers and balls. Let us give you our recommendations.

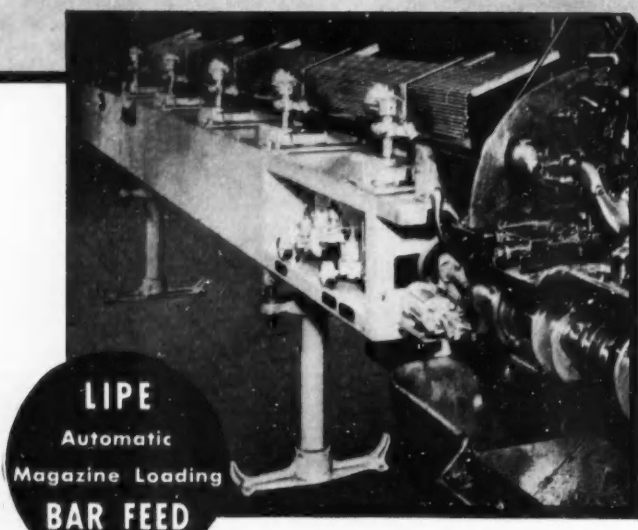
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## THE HARTFORD STEEL BALL CO. HARTFORD 6, CONN.

DETROIT W. S. TORNEY 415 NEW CENTER BLVD.	CHICAGO VICTOR H. CLARK 855 W. WASHINGTON BLVD.	NEWARK, N. J. GUARANTEE TRUST BLDG. 972 BROAD ST.	LOS ANGELES, CAL. E. D. WALSH CO. 1718 SOUTH FLOWER ST.	EXPORT R. A. RODRIGUEZ, INC. 55 W. 42ND ST., NEW YORK
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## BOOST SCREW MACHINE OUTPUT 60% to 100%...EVEN MORE!



Suppose you could run your screw machine continuously—get a full 8-hour-day production—with no time lost for loading, replacing feed fingers, cutting air or idle operation. How much would your production go up? 10%? 20%?

Revise your estimate—you're way low. By converting lost time into productive time in hundreds of plants, *LiPe Automatic Magazine Loading Bar Feeds* have increased output 60% to 100%. One user reports a production increase of 221%!

### WHAT A LIPE AML BAR FEED WILL DO FOR YOU:

*Feed tubes or bars automatically, continuously.*

*Abolish feed fingers—eliminate time lost in making feed finger adjustments.*

*Feed stock up to 16" long in one feed-out operation—save the time lost with multiple feed finger feed-outs, thus cutting cycle time.*

*Reduced cycle time increases gross geared production capacity of screw machine.*

### OUR UNCONDITIONAL GUARANTEE:

**LiPe AML Bar Feed will enable your screw machine to produce at least 90% of its gross geared capacity.**

- Interested? Send for folder describing AML Bar Feed—operation, benefits, case histories.



**LiPe - ROLLWAY CORPORATION**

Manufacturers of Automotive Clutches and Machine Tools  
Syracuse 1, N. Y.

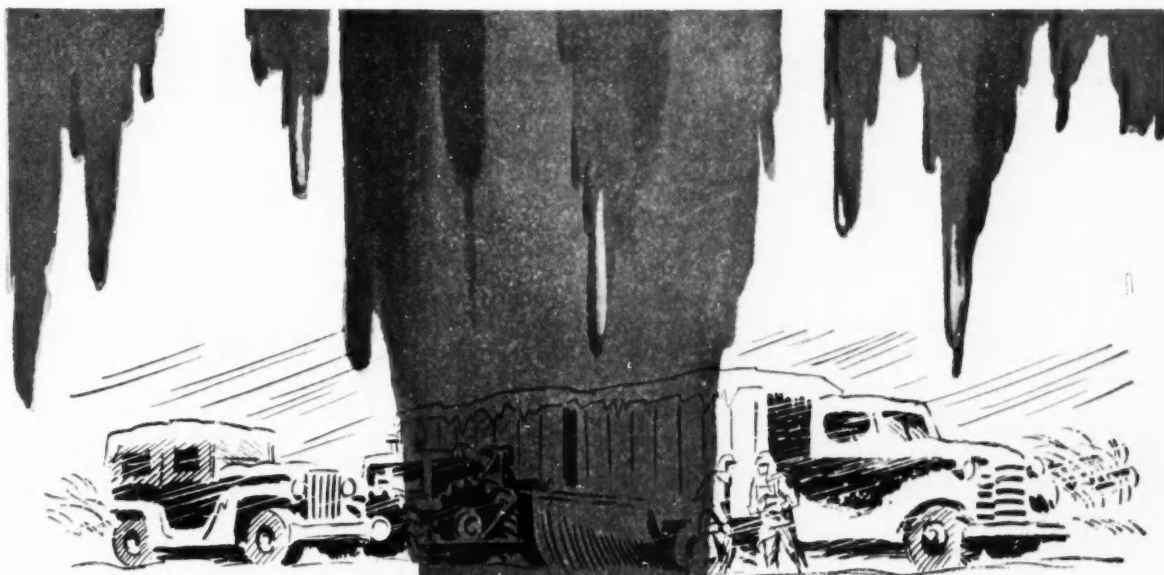
the Hurel Dubois HD 45 and the big Caravelle passenger plane now under construction.

In a class of their own are the low powered gas turbines produced by Turbomeca, ranging from a thrust of 220 to 880 lb, used for take-off boost, on trainer and private planes, and for driving generators, compressors, etc. The latest model is the turboprop Marcadau of 400 hp, which was shown in flight on the Farfadet combined helicopter and horizontal flight plane. This engine is developed from the Turbomeca Artouste with a propeller geared down to 2500 rpm. Excluding the propeller, overall dimensions are: length, 86.5 in.; height, 21.5 in.; and width, 17.7 in. Weight, without propeller, is 306 lb. The speed of the combination machine on which this engine is fitted is 150 mph. Another application of the Turbomeca series was the Palouste turbine air compressor as used on the experimental Djinn helicopter, which delivered air at a pressure of 50 psi to the extremities of the two rotor tips. This differed from a somewhat similar engine which delivered air at 45 psi to combustion chambers on the rotor tips.

## BOOKS...

**ECONOMIC CHANGE**, by Simon Kuznets, published by W. W. Norton & Co., Inc, 101 Fifth Ave., New York, N. Y. Price, \$3.50. One of America's most creative and influential social scientists has assembled in this volume 11 of his essays dealing with various aspects of the most important current concern of economists. Representative titles from each of the major divisions of the book are "Retardation of Economic Growth," "Relation between Capital Goods and Finished Products," and "Foreign Economic Relations of the United States and Their Impact upon the Domestic Economy." Each of the essays is an extended and well-rounded treatment of its subject. Among the essays are some never previously published, some now difficult to obtain, and some available only in foreign periodicals.

**GLOSSARY OF TERMS USED IN METHODS, TIME STUDY, AND WAGE INCENTIVES**, published by Society for Advancement of Management, 411 Fifth Ave., New York 16 N. Y. Price, \$1.00. This handy booklet promises to cut down previous wrangling, aimless discussion, and hair-splitting interpretations over contract language. It is said to be an authentic reference for both management and unions alike. Within the mechanics of management itself, the glossary will dramatically reduce the merry-go-round communications, and help bring about greater concert of effort toward better understood goals. Each of the 332 terms and expressions used is defined on the basis of its interpretation by the greatest number of experienced people using them professionally and successfully.



## When they gotta go... at 65° below!

Perfection engineers are ready to give you the full benefit of our 15 uninterrupted years of designing and producing winterization systems for all types and sizes of vehicles and equipment.

Over 100,000 Perfection systems are in service today. Ask for our Winterization Data File. Perfection Stove Company, 7392-F Platt Avenue, Cleveland 4, Ohio.

To be sure your equipment and vehicles will "go" in sub-arctic service... be sure you get the *right type* of heating system. Come to the people who have successfully developed and produced *BOTH AIR AND COOLANT-TYPE ENGINE HEATERS*.

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1. *Develop the winterization system.*
2. *Apply it to the vehicle or equipment.*
3. *Test it to government specifications in our Cold Rooms.*
4. *Prove that it meets those specifications.*
5. *Guarantee that the equipment will go at 65 below!*
6. *Make the drawings for your production, or produce the systems for you.*

# P<sup>△</sup>erfection

# Transport Vehicles of Czechoslovakia

(Continued from page 51)

wheels have two semi-elliptics centrally pivoted and supported by the differentials. The rigid construction eliminates the need for universal joints on the drive shafts.

The engine is a V-12 Diesel rated at 175 hp at 1800 rpm. This overhead-

valve unit has a piston displacement of 900 cu in.—4.4 in. by 5.2 in. bore and stroke—and its compression ratio is 16.5 to 1. It is forced air cooled by twin blowers, one for each line of ribbed cylinders. The direct injection system includes a pair of fuel injector

pumps with separate booster pumps.

Pressure lubrication is by two oil pumps through a series of filters, sediment being removed from one of these automatically each time the clutch is operated. Power is transmitted through a two-plate dry clutch, four-speed transmission with constant mesh helical gears, and a two-speed gear box.

A two-cyl belt-driven compressor on the front of the engine supplies the six-wheel air brakes, via two pressure tanks, and a tire inflator cylinder. There is an automatic trailer coupler and provision for air brake connection. The electrical system has 12 volt equipment for lighting with two 12 volt storage batteries for the 24 volt starter.

A frame supporting a dump body with hydraulic ram or high drop-sided body is mounted on the tubular chassis and differentials. Differential locks for the rear axles are controlled from the front. Maximum wheelbase is 18 ft, weight (empty) 18,500 lb, and top speed is said to be 32 mph.

The next largest Czech vehicles are a truck and bus based on a common seven ton chassis designated as Skoda 706. The power unit is a six-cyl Diesel of 720 cu in. rated at 145 hp at 1800 rpm. The block is cast integral with the crankcase and wet cylinder liners are employed. There are three pairs of cylinder heads with overhead valves. Heater plugs for cold starting are provided, and a centrifugal governor is attached to the fuel injection pump. A clutch-operated oil filter is similar to that on the Tatra.

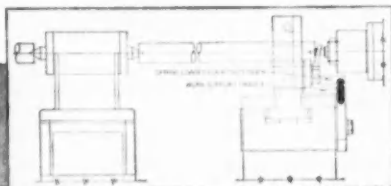
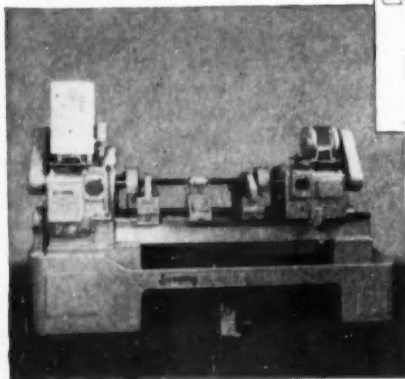
The transmission includes a two-plate dry clutch and five-speed gear box with constant mesh in 3rd, 4th and 5th gears. Air brakes are supplemented by compression braking boosted by a control which simultaneously blocks the exhaust and cuts off the fuel supply. The split propeller shaft incorporates three universal joints and is centrally-supported by a frame cross-member.

On the 706 R truck the rear springs are semi-elliptical of the progressive type. The drop-sided body is built on a reinforced wooden platform carried on a welded sub-frame. A pressed-steel, three-way dump body with hydraulic lift is available as an alternative.

The 706 RO bus seats 41 passengers and maximum speed is given at 40 mph. The steering column and attached instrument panel are moved ahead and to the left of the engine to give forward control. Folding doors are operated electropneumati-

## MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-swing PEOPLE" SENECA FALLS, NEW YORK



vises for holding the two shafts close to the ends to be centered. A special fixture (shown between the two vises) was designed with two centers to hold and locate the two shafts on the ends previously centered.

This method of holding and locating the parts assures constant overall distance between the two centers in each part within close tolerances.

The line illustration shows the detail of the work support and spring loaded locating finger supplied with each vise. The spring loaded locating finger holds the shaft under tension on the double center fixture until the shafts are clamped tightly in the vises.

The machine is entirely automatic in operation after the shafts are clamped. The operator simply pushes the starting lever and the centering spindles advance in rapid traverse to the cutting position, slow down for feed, and then return in rapid traverse to the starting position ready for unloading and reloading.

Seneca Falls engineers welcome inquiries involving your machining problem.

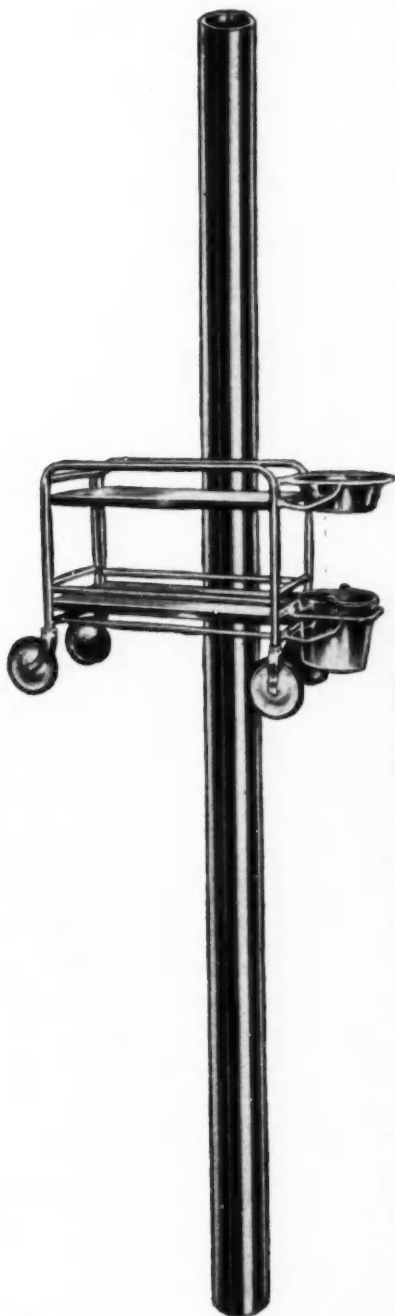
### MODEL "CS" So-swing CENTERING MACHINE CUTS COSTS BY CENTERING TWO SHAFTS SIMULTANEOUSLY

**Problem:** To center one end of two shafts simultaneously or during one cycle of the machine. The previous operation on the shafts consisted of cutting shafts to length and centering one end in an automatic cutting-off machine.

**Solution:** The Model CS Automatic Centering Machine selected for this job was equipped with two standard air operated

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH So-swing



## Here's an idea: Stainless Steel Tubing

Maybe your product has to be attractive. Or sanitary, easy to clean. Or strong, and long lasting. Maybe you want high resistance to heat and corrosion. Easy fabrication. Low end cost.

You'll find all these advantages in ELECTRUNITE Enduro Stainless Steel Tubing and Pipe. Formed from clean, flat-rolled steel. Uniform wall thickness . . . uniform concentricity . . . uniform quality, inside and out. You can bend them. You can join them by fusion or resistance welding. Or solder them. Or braze them. You can grind, polish or buff tubing to a mirror-like finish . . . I.D., O.D., or both. Or Republic will do it for you. We'll fabricate it, too.

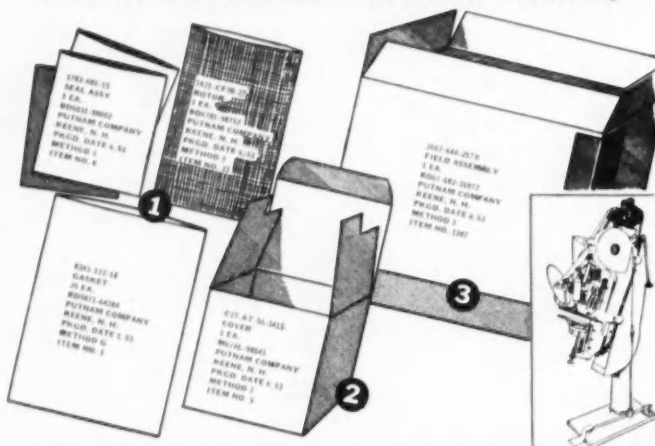
ELECTRUNITE Enduro Stainless Steel Tubing and Pipe are available in a variety of chromium-nickel analyses. Tubing also in type 430. The type that fits your particular application . . . properly used . . . can pay its way in better performance and lower maintenance costs. Republic engineers and metallurgists will be glad to help you choose it. For design data and specifications, write to:

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**REPUBLIC STEEL CORPORATION**  
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PRODUCED BY THE MAKERS OF ELECTRUNITE — THE ORIGINAL ELECTRIC WELDED BOILER TUBE



**MARKEM****SOLVED THIS MARKING PROBLEM****IDENTIFICATION MARKING  
FOR CONTRACT AND OVERSEAS PACKING**

In contract and export packing of parts, assemblies, etc., certain JAN specifications call for three packaging stages: (1) enclosure in scrim-back or polyethylene lined *heat sealing* envelope, (2) intermediate packing in a folding box, (3) final packing in corrugated carton. Each of these three types of containers must be marked for instant and *permanent* identification. Many manufacturers, dissatisfied with conventional marking with crayon, stencil, labeling or other form of hand stamping, have not only found great savings in time and money, but also obtained more legible, longer lasting identification using a Markem Method. One Markem machine (with appropriate Markem type and Markem ink) prints desired information on *all three* containers. The vapor barrier of the envelope is not broken. Desired information is changed rapidly. By printing quantities of containers as and when needed, inventory problems are minimized. In this way, the Markem Method insures *positive* identification when the items reach their destination.

**MARKEM****MARKS THEM ALL****CAN MARKEM  
HELP YOU?**

Identification printing for contract and overseas packaging is but an example of how Markem solves industry's marking problems. Markem has been providing industry with production techniques and equipment to identify, decorate or designate its products, parts and packages since 1911. Markem also provides technically trained men who are available in your area to assure *continued* satisfaction with Markem methods and equipment.

When you have a marking problem, tell us about it and send a sample of the item to be marked. Perhaps a complete Markem Method has already been developed to solve your problem. If not, Markem will work out a practical solution.

Markem Machine Company, Keene 8, N. H., U.S.A.

**MARKEM**  
... TO MAKE YOUR MARK

cally from the driver's seat and safety glass is used throughout.

The second truck-bus pair has a three-ton chassis fitted optionally with a Diesel or gasoline engine. The four-cyl, OHV Diesel with 274 cu in. piston displacement is rated at 60 hp at 2000 rpm, while the six-cyl, 212 cu in. gasoline unit develops 70 hp at 3000 rpm. Oil-engined vehicles are known as Praga RND, gasoline-powered as Praga RN.

A single-plate dry clutch is followed by a four-speed transmission. As with the Skoda, the propeller shaft is in two sections, with the cased universal joint of the torque tube lubricated by a foot-operated pump in the driver's compartment. Brakes are hydraulic.

Either chassis is available with a drop-sided wooden or pressed steel dump body, as a panel truck, or 40-passenger bus with longitudinal seats.

**BOOKS ...**

**ECONOMIC STABILITY IN A CHANGING WORLD**, by John H. Williams, published by Oxford University Press, 114 Fifth Ave., New York 11, N. Y. Price, \$5.00. The essays and papers collected in this volume contain a synthesis of the most mature thought on current economic problems, both domestic and international, by a leading practical economist who knows not only the theories but also the hard facts of reality. In his capacity as a banker, a university teacher, and an adviser on American aid to postwar Europe, the author combines thorough working experience of monetary matters at home and abroad with a sound knowledge of the whole body of economic doctrine as expounded by classical and Keynesian economists. This combination of experience and academic knowledge has of necessity directed his attention toward the clash between theory and practice, and both the contents as well as the arrangement of the material included in the present volume reflect his paramount interest in this fundamental question. In the first three essays, grouped together under the heading "An Economist's Confessions," he deals with current problems for which formal theory has failed to provide a satisfactory answer, and seeks to determine how much our economic thinking and theorizing does in fact direct policy and how much it merely follows changing circumstances, rationalizing as best it can after the event. In the second part of his book Mr. Williams turns to the financial problems of postwar Europe. In three papers on the Marshall Plan he offers, from the vantage point of his experience, a detailed examination of what the European Recovery Program set out to do and what it had in fact achieved by the middle of 1952, when it had been hoped that Western Europe would be able to stand on its own feet. The third part begins with a paper entitled "Free Enterprise and Full Employment," in which he deals with the long-term operation of American economy under peacetime conditions. A final paper, "The Monetary Doctrines of J. M. Keynes," reflects his life-long interest in Keynesian theories and their effect on modern economic thought and practice.

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for Practically Any  
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Open and enclosed motors up to 100 h.p.  
for standard foot mountings. NEMA C&D  
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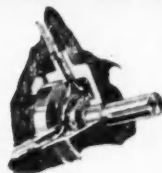
A GENERAL MOTORS PRODUCT  A UNITED MOTORS LINE

DISTRIBUTED BY WHOLESALERS EVERYWHERE

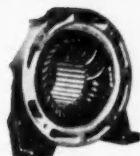
These Features tell you why you're Right with Delco



Water-Tight Conduit  
Box. Protects  
against moisture.



Positive Lubrication.  
Lengthens bearing  
life.



Delcote Insulation.  
Permanently flexible,  
moisture-proof,  
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Positioned Bearings.  
Maintain shaft  
alignment.



Dynamically  
Balanced Rotor and  
Shaft Assembly.  
Reduces vibration.



Corrosive-Resistant  
Cast Iron frame.  
More solid, more  
rugged.

# Defense Contract Termination

(Continued from page 65)

Government property or the termination claim.

6. Secure as promptly as possible settlement claims from subcontractors.
7. Prepare his own settlement claim and have available cost records for audit or review.
8. Dispose of termination inventory in accordance with the contracting officer's instructions.

## Settlement Proposals

A contractor may prepare and submit his claim on an inventory basis or total cost basis. However, if neither one is feasible, he may apply to the contracting officer giving reasons for some other basis.

Under the inventory basis the termination inventory is priced at purchase or manufacturing cost. To this amount are added the costs of the

contractor in settling with subcontractors and other applicable costs, and an allowance for profit or an adjustment for loss, if any, is made. Use of the inventory basis will be generally preferred by most contractors.

When use of the inventory basis is not practicable or will unduly delay settlement, the total cost basis may be used, provided its use is approved by the contracting officer. Under this basis all the costs incurred under the contract, up to the effective date of the termination, are summarized and an allowance for profit or an adjustment for loss, if any, is made.

All payments previously made or to be made by the Government for completed units are then deducted. To this amount are added the costs of the contractor in settling with subcontractors and other applicable settlement costs. This amount represents the gross termination claim from which are deducted disposals and other credits.

## Forms Available

A series of forms have been prepared for use by contractors in the preparation of termination claims. The information submitted and figures assembled are subject to review, and depending on amount of claim, subject to audit by the service involved.

The contractor is required to prepare only one schedule of accounting information, but may have a number of claims to file under a termination order.

The schedule of accounting information permits the contracting officer to analyze the accounting system of the contractor and determine the acceptability of the costs. Methods of computing burden, general and administrative expenses, direct labor, material, etc., must be explained, as well as answering the accounting questions.

The contractor may file his claim on either the inventory basis or the total cost basis. Special forms are provided for each method. The forms must be filled in complete in every detail. The services have demonstrated a thorough attitude on having complete answers to all questions.

To support the claims, the contractor must prepare the proper inventory schedules on which he has itemized his inventory. The schedules are:

Schedule A—Metals in Mill Product Form

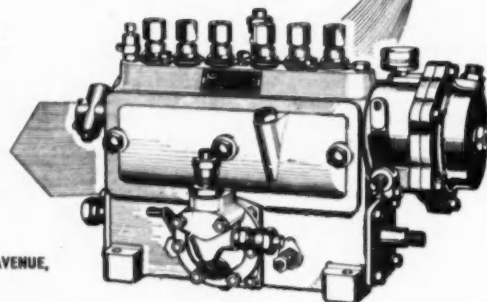
(Turn to page 128, please)



**The world's largest  
manufacturers of  
Fuel Injection Equipment  
for diesel engines**

**Depots and  
Service Agents  
in over  
100 countries**

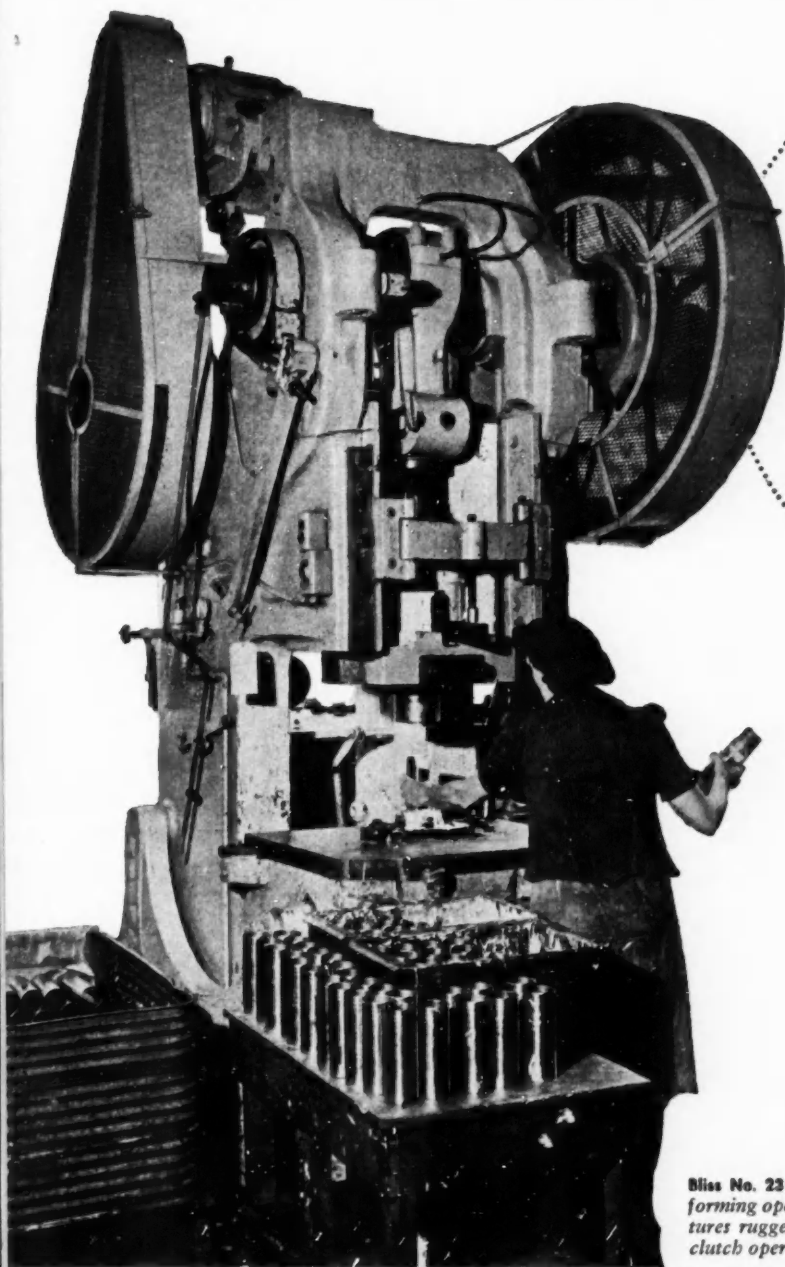
C.A.V. DIVISION OF LUCAS  
ELECTRICAL SERVICES INC.,  
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**Fuel Injection and Electrical Equipment**

174-604

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*Not a dime spent  
on maintenance in  
8 years in **Snyder's**  
ALL-BLISS press shop*

Snyder Manufacturing Co. of Philadelphia discarded all their old presses and equipped their shop 100% with Bliss inclinable and straight-side presses back in 1945.

That was a significant decision for the world's largest manufacturer of television and auto radio aeralis.

Results? In the eight years that Snyder's press shop has been all-Bliss, they have not had to spend a *single* dime on maintenance of the 25 Bliss presses.

And, as the press room accident rate dropped to zero with the Bliss presses, operators found they could run the presses faster.

The Snyder story is not unique. Bliss is the dominant factor in press room after press room. For a complete press room or a single press for a given job, you'll find it's best to call in Bliss.

**Bliss No. 23 Inclinable Press, used by Snyder for forming operations on television accessories, features rugged construction, fast and dependable clutch operation.**

**E. W. BLISS COMPANY, CANTON, OHIO**

U.S. plants at Canton, Toledo, Salem, Ohio; Hastings, Michigan

, E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

**PRESSES, ROLLING MILLS, SPECIAL MACHINERY**

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. West Coast Representatives: Norris Machinery Company, Los Angeles and San Francisco; Star Machinery Company, Seattle. Other Bliss representatives throughout the world.

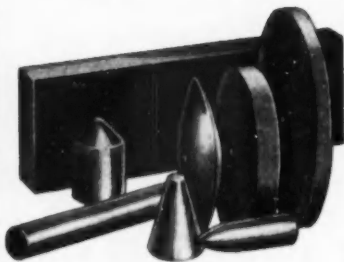
## BLISS

**ON YOUR PRESS IS MORE THAN  
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Simplify Your  
BURRING, SMOOTHING  
and POLISHING operations  
**CRATEX**  
RUBBERIZED ABRASIVES

*"cushioned action performance"*



Today's changing manufacturing picture — new production methods, new metals, increased use of plastics, new finishes, the rise in labor and material costs — all of these factors deserve the consideration and use of Cratex Rubberized abrasives for:

**BURRING • SMOOTHING • POLISHING**  
Cleaning, Blending, Lapping, Finishing  
and Trimming Operations

CRATEX Rubberized Abrasives are made in four "grit-types" from coarse to extra fine — and over 160 standard sizes in—


**WHEELS • POINTS • BLOCKS  
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Ideal for Machine or Manual application on hard or soft Metals, Plastics, Glass and scores of other materials.

Backed by 30 years of industrial, professional and technical application-performance, CRATEX Rubberized Abrasives have achieved an unduplicated reputation for lowering "unit costs" with unparalleled results in burring, smoothing and polishing operations. Investigate Cratex Rubberized Abrasives . . . "The World's Finest For Industrial Use" . . . send today for Descriptive Catalog which gives full details, applications and prices.

**CRATEX FREE TECHNICAL SERVICE**

Cratex abrasive engineers will gladly, without charge, analyze your individual production operations and recommend the correct "rubberized abrasives" to lower your production costs and to meet your burring, smoothing and polishing problems. Check the coupon for—"Application Analysis Form."

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Without any obligation please send us—

- ☐ Descriptive Catalog.  
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INDIVIDUAL \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**Contract Termination**

(Continued from page 126)

- B—Raw Material other than Metals, Purchased Parts, Finished Components, and Finished Products  
C—Work in Process  
D—Dies, Jigs, Fixtures, etc., and Special Tools

**Profits Allowed**

A contractor is to be allowed a profit only on preparations made and work done for the terminated portion of the contract up to the date of termination.

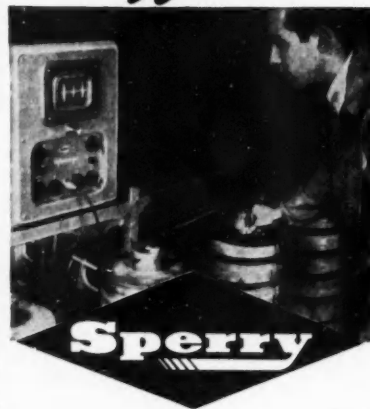
No profit is to be allowed on settlement expenses, subcontractors' claims and interest on borrowings considered as an allowable item of cost.

1. Methods for determining profit.
  - a. That which both parties agreed upon or contemplated at the time the contract was negotiated.
  - b. That which the contractor would have earned had the contract been completed.
  - c. That which the contractor agreed to accept in the event the contract was terminated.
2. Factors to be considered in determining profit.
  - a. The efficiency of the contractor or subcontractor, with particular regard to attainment of quantity and quality production, reduction of costs and economy in the use of materials, facilities, and manpower.
  - b. The amount and source of capital employed.
  - c. Extent of risk assumed.
  - d. Inventive and developmental contributions and cooperation with the Government and other contractors in supplying technical assistance.
  - e. Character of business, including source and nature of materials, complexity of manufacturing techniques, character and extent of subcontracting.
  - f. Such other factors as fair and equitable dealings may require.

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*is your News Magazine of  
Automotive and Aviation  
MANUFACTURING*

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REFLECTOSCOPE  
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Dependable, non-destructive testing is often vitally important even though the need may occur at infrequent intervals or involve relatively few pieces. SPERRY INSPECTION SERVICE makes Ultrasonic Testing economically available under these conditions. You can hire a Sperry REFLECTOSCOPE and the services of an experienced inspection engineer whenever you need them . . . for any length of time from four hours up.

You'll find this service ideal for periodic machinery inspections, testing shipments of raw materials, testing new or pilot-model products, periodic quality checks and countless other applications to eliminate on-the-job failure or to prove and improve product quality.

Almost any material can be tested; hidden defects are quickly and dependably located in up to 30 feet and over of solid steel. Write now for complete information.

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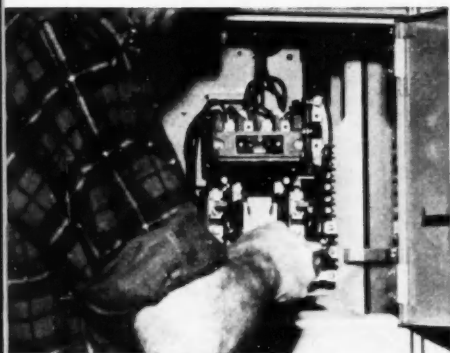
- ☐ Please put me on your mailing list for Industrial Application Reports.  
☐ Have a SPERRY Representative drop in when in the area.

MATERIAL TO BE TESTED \_\_\_\_\_  
NAME \_\_\_\_\_  
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COMPANY \_\_\_\_\_  
CO. ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**ENGINEERED FOR YOU,**  
the new G-E motor control center is the result of intensive field surveys which told us what industry wants most. It provides maximum flexibility (units easily interchangeable) for central control of a-c motors up to 200 horsepower.



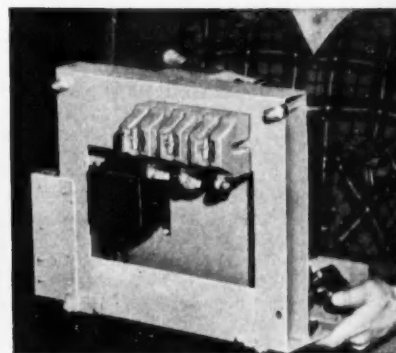
## Here are Six Reasons for Specifying the New G-E Motor Control Center



**1 FOUR-INCH TROUGH** for incoming power lines; terminals in front for easy wiring, maximum accessibility.



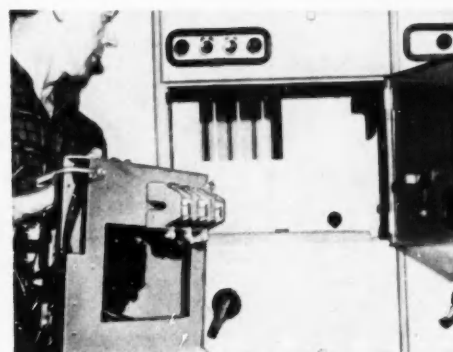
**2 UNITS EASY TO CHANGE.** To remove, disconnect terminals, pull unit out. Units easily changed since all components are on unit frame.



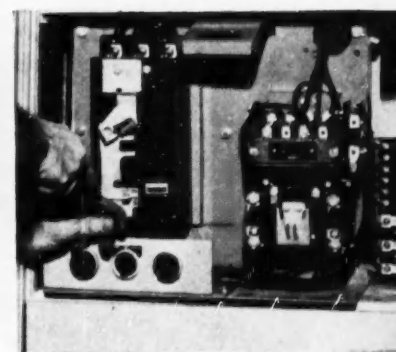
**3 LIGHTWEIGHT UNITS** are compact and easy to handle. This Size 1 starter unit weighs only 30 pounds.



**4 ACCESSIBLE WIRING.** Contactors, relays, pushbuttons, and breaker are easily accessible from all four sides.




**5 BUS PROTECTED.** Steel barrier keeps personnel away from bus. For added safety, compartment doors can be closed while unit is out of compartment.



**6 DISCONNECT POSITION** cuts unit power off; bus connections made automatically in operating position.

**FOR FURTHER INFORMATION,** contact your nearest G-E Apparatus Sales Office or authorized G-E distributor, or write Section 781-2 for Bulletin GEA-4979A today. General Electric Company, Schenectady, New York.

*You can put your confidence in—*  
**GENERAL  ELECTRIC**

## METALS

(Continued from page 94)

unsettled with the trend downward until effective means are adopted to curb over-production.

### Price of Copper Wire and Cable Reduced

When the Phelps Dodge Copper Products Corp., manufacturing subsidiary of Phelps Dodge Corp., cut the prices of copper wire and cable

by 1.57 to 2.1 cents per lb, followed quickly by General Cable Co. and Anaconda Wire & Cable Co. with similar cuts, it signalled that the long anticipated downward adjustment in copper and probably in brass prices was definitely under way.

Prior to this action on July 10 prices for most copper and copper alloy products had been based generally on a refined copper price of 32.1 cents per lb, which was compiled by the old formula by which fabricators formerly received 60 per cent of their copper from domestic supplies at 30

cents and 40 per cent at 36½ cents, the price tenaciously demanded by the Chile Government. For many weeks it had been apparent that this price was unrealistic because of the increasing amounts of foreign copper entering the New York market from foreign sources other than Chile, which was freely offered at 29½-30 cents per lb.

### Chile's Position Becomes Untenable

Net imports of copper in April into the United States totalled 58,500 tons, which is at the annual rate of over 700,000 tons, or more than 70 per cent of the entire domestic mine production. April imports were 10,000 tons more than in March and 20,000 tons more than the monthly average in 1952. Rhodesia and Belgian Congo are steadily increasing shipments here and their copper is sold on a strictly competitive basis.

With these increasing supplies available at a price substantially less than demanded by Chile, it is not surprising that unsold stocks of metal at Valparaiso are steadily increasing and were estimated to total about 40,000 tons on July 1. How much longer Chile can afford to carry so large an inventory is doubtful. It could not have been done if the two big American-owned Chilean copper producers had not been able to place high-priced Chilean metal with their own fabricating units. It appears evident that their own competitive position will now become more difficult following the price cuts in wire and cable products.

### Trade Expects Copper Price Unsettling

Commenting on the copper situation, a vice president of American Smelting & Refining Co. observed that trading in copper futures in London to begin August 5 might prove to be the catalyst that will precipitate action by the Chileans. Considering the cost of production of most of the world's copper and the competitive position with aluminum, currently selling at 20 cents per lb, a 30 cent price for copper seems on the high side.

May statistics on fabricators shipments and stocks were disquieting. The fabricators received 146,800 tons of metal but shipped only 127,600 tons. As a consequence, inventories gained in May to total 364,200 tons, the highest monthly total since March, 1950. Deliveries of copper

## Manufacturers of... HARDENED and GROUND PARTS for over 40 years

**S**INCE the day of the duster and goggles, The Brown Corp. has meant highest quality precision parts for the automotive industry. Today, Brown Parts serve trucks, tractors, trailers, buses, axle builders, off-the-road machines and Diesel locomotives. The production methods and facilities we have developed are unexcelled—uniform product quality is assured—deliveries are reliable—service is efficient. Ask any of our long list of satisfied customers throughout the industry.

For further information about our specialized production of hardened and ground automotive and industrial parts, just drop us a note. We invite an opportunity to quote on your work.

*Henry W. Brown*  
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KING PIN

#### Parts include . . .

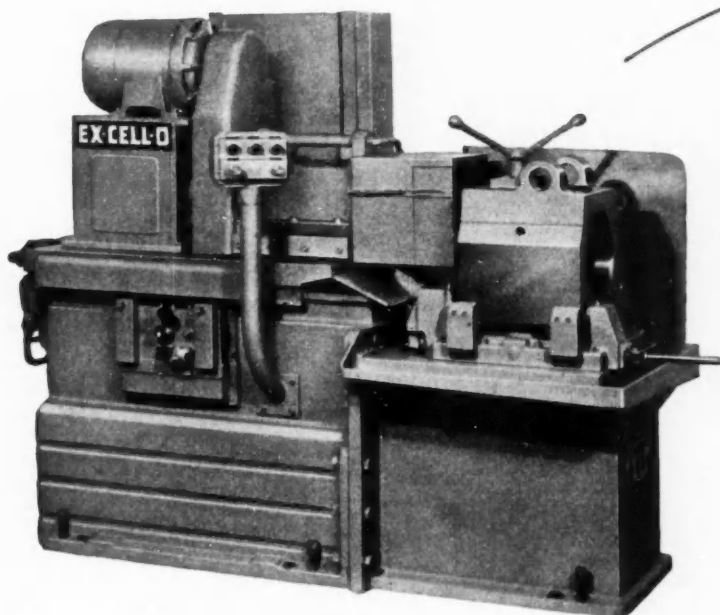
King Pins  
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Shackle Pins  
Brake Anchor Bolts  
Countershafts  
Idler Shafts  
Stub Axle Shafts  
Steering Ball Bolts  
Beam Bolts and Bolts  
5th-Wheel Rocker Shafts  
Wheel Studs  
Water Pump Shafts  
... anything in the  
hardened and ground  
line, of any analysis  
steel, up to 4¼" diameter.

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Ex-Cell-O One-Way Precision Boring Machine is equipped for operations on a heavy gun part. The machine table carries a precision boring spindle with its drive equipment, and the end section supports the fixture.

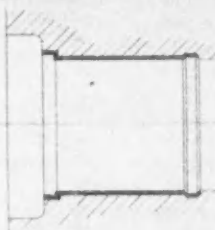
# EX-CELL-O

## WAY MACHINE

**PRECISION BORES,  
COUNTERBORES... AND  
GROOVES A 600-lb.  
STEEL FORGING**



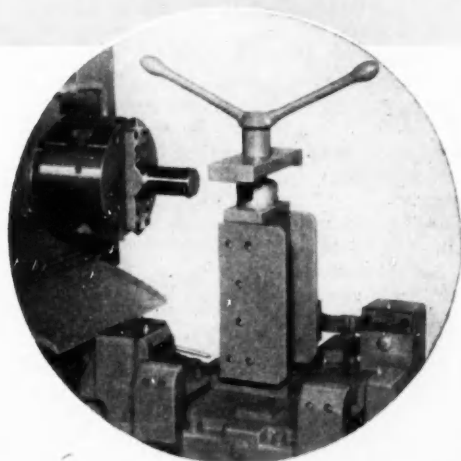
On a large gun part, operations shown in the heavy lines are performed in an automatic cycle.



As the table feeds forward the boring and

counterboring operations are performed, then the shoulder is plunge-faced at a reduced feed rate. When the table engages a positive stop the cross feed head plunges the grooving tool to the required depth, then the table feeds back to another positive stop which limits the width of the groove. The cross-feed head retracts and the table returns to the starting position.

Ask your local Ex-Cell-O representative about all the other advantages of Ex-Cell-O Way Machines, or write today for Bulletin 31631.



Close-up view of the cross-feed head on the spindle. It carries three tools for boring, counterboring, and grooving the heavy gun part in an automatic work cycle.

# EX-CELL-O

## CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS  
RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT  
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Glass has a smooth, abrasion-resistant surface — won't scratch or pit. Glass never deteriorates. It retains its original strength and clarity under all kinds of weather and wear. Glass won't stain or corrode. Chemicals used on the highway don't damage it. And glass can't warp, shrink, burn or rust.

*With all these advantages, Lancaster glass costs less — up to 50 percent less — than substitute materials.*

Design flexibility? Glass is the ideal material where intricate shapes and exact tolerances are involved. Send the blue prints and complete details of the job you're working on now. Let us suggest how glass can solve your optics problems.

**The Lancaster Lens Co.**  
**LANCASTER, OHIO**

Industrial glass made to your specifications

outside the United States by foreign producers declined sharply during the month.

## Lower Rate Foreseen For Steel Output

Tempered optimism characterizes the outlook for steel in the months ahead. Without any doubt the steel shortage is over. That doesn't mean that demand will come apart at the seams, but it does mean that the frantic rush to stock up on steel, to build up unbalanced inventories, to pay fancy prices for conversion steel and foreign steel for immediate delivery, are past history. More careful buying, with emphasis on cost and insistence on specifications will be the order of the day.

That a decline in the rate of steel ingot production will be seen in the fourth quarter admits of scarcely any argument. Indeed it is already taking place. For six weeks up to the middle of July operations have been below the hectic 100 per cent rate that made the first six months of 1953 the biggest in the history of the steel industry. Admittedly, a 95 per cent rate as maintained in July means a highly satisfactory level of business, but there's considerable doubt if it can be continued.

According to American Iron and Steel Institute, production in June was 9,419,000 net tons of ingots and steel for castings, compared to 9,997,080 tons in May. The production of the first half of 1953 totaled 57,960,457 tons. This total was more than 5 million tons above the greatest previous half-year, in the latter half of 1951 when the output in the United States was 52,895,863 tons. The new total was about 13 million tons or 29 per cent higher than the output in the first half of 1952.

Estimates for the year by those in the trade vary from 104 million tons to 112 million tons. It is also pointed out that the actual steel capacity today is 120 million tons annual rate, and by the end of the year it will be 123 million tons.

Signs are not lacking that real selling efforts will be needed to move the tremendous tonnage that will be produced. Not all of the recent increases in steel costs will be passed on to consumers. Some companies, in order to maintain their competitive position, are absorbing them. Conversion business is at a standstill. Some cancellations have been noted, and the cut-back in Government defense orders has resulted in larger inventories for some defense manufacturers.

## Cut costs, boost production with Weldments!

● If you are now using costlier forgings or castings in your plant, you'd be wise to consider the many advantages — costwise and otherwise — offered by modern, improved weldments. Here are the facts about weldments . . . and what they can do for you!

### ECONOMY

Weldments save you money in two ways:

1. Where forgings and castings require a single grade of steel throughout the forged or cast piece, weldments can incorporate higher-grade alloys in greater stress areas and lower-grade metals in other areas.

2. Weldments can be produced far closer to finished dimensions than forging or casting procedures permit. This means you buy less poundage in the beginning, require fewer machine hours finishing the pieces, and greatly reduce scrap losses.

### SERVICEABILITY

Weldments are equal or superior to forgings and castings in many applications, including the following:

1. In structural members of much production machinery — bases, supports, boxes, housings, and various other stationary parts. (Usually produced to such close tolerances they are delivered ready to use.)
2. In much railroad equipment.
3. In heavy construction and industrial equipment — notably off-the-road motorized vehicles, such as derricks, earth-movers, tractors, and excavators.

We will gladly design and produce samples for performance tests, at cost. Also, we are equipped to furnish X-Ray quality where required.

### AVAILABILITY

Because weldments conserve critical materials, they can be produced more readily than forgings or castings during times of shortage. When you order weldments, you can depend on sure, prompt delivery.

We'd like to discuss the advantages of weldments in your business. Write or wire us today — or better yet, telephone collect — and we'll arrange to have a representative bring the full story right to your desk, at your convenience. No obligation, of course.

Emerson-Scheuring Tank & Manufacturing Co., Inc.  
2077 Martindale Avenue • Indianapolis 7, Indiana

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Fabricators of processing and special equipment in stainless steel, Hastelloy, pure nickel, aluminum, monel and other alloys.

# 1953 Mobilgas Economy Run Proved Again B-W Overdrive *pays off!*



Top 9 cars (on miles-per-gallon basis) including Sweepstakes winner—  
all equipped with this famous Borg-Warner Transmission unit—averaged

## 25.27 MILES PER GALLON

Again this year the records proved: B-W Overdrive means more miles per gallon of gas!

In the grueling, 1206.1-mile Mobilgas Economy Run—sanctioned and supervised by the Contest Board of the AAA—the 9 best actual miles-per-gallon records were made by 1953-model cars equipped with Borg-Warner Overdrive.

And in every year of this annual contest, the *ton-miles-per-gallon* Sweepstakes winner has been equipped with this famous Borg-Warner transmission unit.

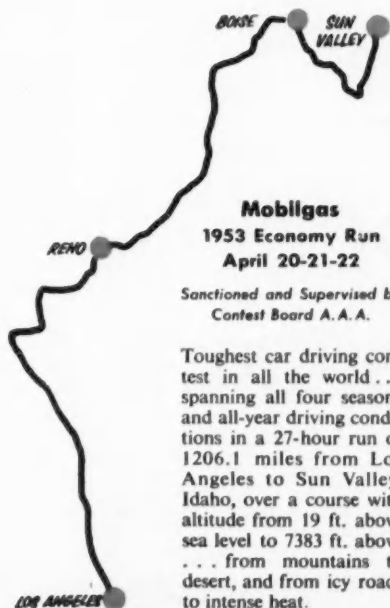
What better proof could you want of real fuel economy!

### SAVES GAS—CUTS ENGINE WEAR

An advanced-type transmission, B-W Overdrive automatically cuts engine revolutions 30%. At 50, for instance, the engine is taking it easy at only 35! That saves gas. Saves engine wear, too—means longer life and fewer repair bills.

Made exclusively by B-W's Warner Gear Division, Overdrive is now offered on 13 leading makes of cars. Proof again that... *B-W engineering makes it work—B-W production makes it available.*

## Borg-Warner



**Mobilgas  
1953 Economy Run  
April 20-21-22**

Sanctioned and Supervised by  
Contest Board A.A.A.

Toughest car driving contest in all the world... spanning all four seasons and all-year driving conditions in a 27-hour run of 1206.1 miles from Los Angeles to Sun Valley, Idaho, over a course with altitude from 19 ft. above sea level to 7383 ft. above... from mountains to desert, and from icy roads to intense heat.



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# New Chrysler Transmission

(Continued from page 50)

admitting oil under pressure into the servo chamber. However, initial engagement in reverse is cushioned by hydraulic action between the reverse servo piston and piston sleeve rather than by a spring as in the case of the kickdown servo.

Once the driver has selected the desired driving range, the hydraulic control system automatically takes

over, determining which band or clutch to apply, when to apply it, and how fast.

Oil pressure is furnished by the front gear pump, which rotates at engine speed. The rear gear pump, connected to the transmission output shaft, remains inoperative when in neutral. After leaving the front pump and front pump check valve, the oil

pressure is regulated at 90 psi by the regulator valve. Oil pressure is further reduced to 60 psi by the converter control valve before entering the torque converter. From there, the temperature of the oil is reduced in the oil cooler before it is fed to the transmission lubrication system at 15 psi.

When in the Drive Range, upshifting into direct drive from low is accomplished through the use of a shift valve which directs oil to the direct clutch piston chamber and to the off area side of the kickdown servo, simultaneously engaging the direct clutch and disengaging the kickdown band.

The shift valve is the core of the brains provided by the control system, since it determines the proper car speed for upshifting the transmission to direct drive. At light throttle, the upshift occurs at relatively low speeds for quiet, economical performance. At moderate to heavy throttle, however, the upshift is delayed until higher speeds are attained, providing faster acceleration.

Selection of the proper time for upshifting is made possible by two signal pressures: throttle pressure, which is proportional to throttle opening, and governor pressure, which is proportional to car speed.

Governor pressure acts on one end of the shift valve, while throttle pressure and spring force act on the other end. When governor pressure becomes great enough to overcome the opposing forces due to throttle pressure and the shift valve spring, the shift valve moves to the upshifted position, allowing line pressure oil to proceed to the off side of the kickdown servo and to the direct clutch. At light throttle, a low governor pressure at a correspondingly low car speed is sufficient to accomplish this, but at heavy throttle, a high car speed is necessary before governor pressure is capable of overcoming the high throttle pressure. In this manner, the shift valve upshifts the transmission at the most opportune time to meet the demands of the driver.

Once the shift valve initiates an upshift, a built-in snap action prevents the possibility of any hunting. The shift valve remains in the upshifted position unless the driver intentionally downshifts, or the car speed drops below 11 mph. If the car speed falls below 11 mph, the force of the shift valve spring is then sufficient to downshift the valve against governor pressure.

Whenever car speed exceeds about 35 mph, the entire output of the front



## All salesmen are not engineers!

Unlike salesmen with the single ambition to sell more goods, Sales Engineers analyze customers' problems, make expert recommendations, see the job through.

Klem has no salesmen—just Sales Engineers supported by lab facilities that duplicate any production condition to assist them in solving problems.

Place your tough job in the hands of a Klem man. The assignment will be followed. The sale will be regarded as made only when the product furnished is doing the job you want done.



### 3 OF 20 STANDARD KLEM PRODUCTS

**KLEM KOTE**—Cleans, conditions ferrous metals and aluminum surfaces—imparts a phosphate coating for better paint adhesion. Non-toxic, requires no special handling precautions.

**KLEM KLEANER No. 144**—Rapid, thorough, heavy duty still tank cleaner for ferrous metals. Removes the most difficult soil.

**RUST-SOL No. 124**—Concentrated phosphoric acid surface cleaner. Removes oil and rust. Provides slight etch to promote paint adhesion. Meets USA 3-213, TAC-ES431 and MIL-C 10578.

### KLEM PRODUCT of the MONTH

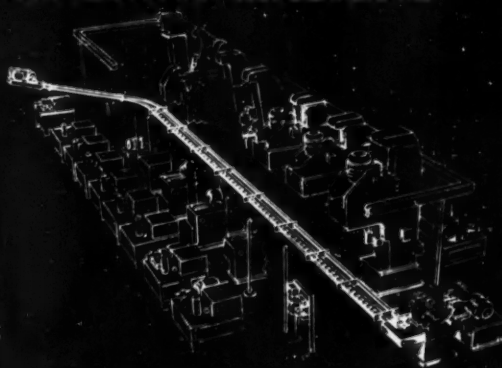
#### Klem Water Wash Compound No. 203

Reduces Spray Booth maintenance costs, keeps circulation lines, water pumps, nozzles and baffles free of paint sludge. No 203 floats the paint, makes reclaiming of paint easier. Write for details.

**KLEM Chemicals Inc.**  
14401 LANSON ... DEARBORN, MICHIGAN



# NATCO selects HAPMAN TUBULAR CONVEYOR TO REMOVE ALL CHIPS from 98-operation HOLEWAY MACHINE



**AUTOMATIC CHIP REMOVAL IS ESSENTIAL** while this machine mills, trepans, drills, counterbores, reams and chamfers a cylinder block every 1.1 minutes!

**SO NATIONAL AUTOMATIC TOOL CO. SELECTED A HAPMAN Tubular Conveyor** as an original component for the unit. With its Neoprene Flights and patented Sealed-Pin Chain, this Conveyor provides the engineering excellence required for such an important investment.

**HAPMAN CONVEYORS CAN DO THE JOB** on many of *your* machine tools, sludge tanks and other equipment too! On new machines—or added to existing equipment—they'll convey almost any bulk flowable material in your plant at big savings!



Conveyor cross-section shows Flights and Sealed Pin Chain.



GET FULL DETAILS. WRITE FOR BULLETIN AI-853

**Hapman CONVEYORS, INC.**  
DIVISION HAPMAN-DUTTON COMPANY  
KALAMAZOO MICHIGAN

# STOP RUST

## ORCHARD VPI PAPER PREVENTS RUSTING ON ALL FERROUS METAL PARTS & PRODUCTS

ORCHARD VPI is economical . . . is easy to use . . . and is convenient to handle. This famous Orchard product protects ferrous metals from rust for years by releasing a vapor . . . which forms an invisible film on the metal surface. Perfect for automotive parts, engines, tools, machinery as well as heavy equipment and small arms.

VPI is economical; it eliminates the need for greases, and oils, keeping the metal part ready for immediate use. ORCHARD VPI is available in rolls, sheets, bags or shrouds for use with any product.

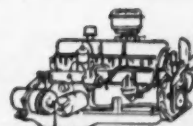
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Military Specifications  
MIL-P-3420 and MIL-V-8574



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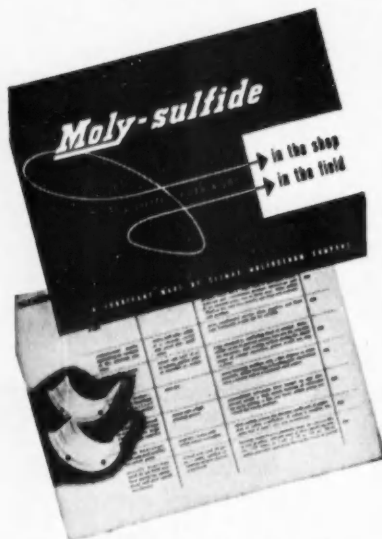
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Send us complete details and samples of Orchard VPI, for use with our product.

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136

pump, together with any excess oil from the rear pump, is recirculated to the front pump inlet by the regulator valve. The rear pump then supplies all the oil for the transmission. Since it is smaller than the front pump, it absorbs less power in maintaining oil pressure at these speeds. In the event the car is pushed to start, the rear pump becomes the only source of oil pressure, as the front pump is then inoperative.

Placing the selector lever in the Low Range locates the manual valve so that oil at line pressure (90 psi) is directed to the shift valve, forcing it to remain in the downshift position regardless of car speed. The vent lines from the direct clutch and the kickdown servo "off" area are open to the sump through the shift valve, while oil from the manual valve actuates the apply side of the kickdown servo. The transmission therefore operates in low gear at all times.

When the transmission is shifted to Reverse, the manual valve routes oil pressure directly to the reverse servo, applying the reverse band. Line pressure is regulated at 250 psi instead of 90 psi as for all other selector positions. This higher pressure is required to hold the high reverse band reaction forces with a servo piston of reasonable diameter.

In the interest of simplification, some control valves have been omitted from the explanation of the mechanism.

## Industrial Mobilization Realigned

(Continued from page 68)

to bear this out. Cancellation of several aircraft contracts adds to the picture.

Actually, the Wilson and Flemming views are not too far apart. Dr. Flemming speaks in terms of capacity, aiming for a higher production potential; Secretary Wilson speaks in terms of actual output, aiming at lumping defense orders into fewer contracts over a longer period.

A Pentagon source told AUTOMOTIVE INDUSTRIES it might be illustrated this way: firms A, B, and C are making an item, but because of stretchout only a certain quantity is needed. If the orders are spread equally, cost would rise and perhaps none of the plants could maintain a production line.

It is found that firm B will go

along, shut down production and keep equipment on a standby basis. But firms A and C either can't or won't. B's contract is therefore cancelled or allowed to expire and the remaining business split between A and C, keeping their assembly lines available and operating.

During the next 15-18 months the Pentagon will face the problem of what to do with 60,000 idled machine tools and other items from at least 12, perhaps more plants, including nine of 14 plants now used for tank, truck, and engine production.

An ideal situation would be to leave them in the plants. In many cases this will not be possible. The Pentagon has asked Congress for a sizable sum with which to renovate and store such items.

This will help build the "broad" mobilization base. But it is no secret that ODM is relying upon private industry through "normal expansion of industry within the workings of the free enterprise system," to plug up many of the holes revealed by its survey. Tax write-offs and other incentives are to be offered.

## Vance Plan Again

More than that, the ODM policy statement indicates that the Vance plan for stockpiling capacity—rather than end military items—is much closer to being put into operation.

It is expected that the ODM survey will show that in order to establish a broad mobilization base, major needs will lie in the machine tool and allied capital equipment fields—particularly for equipment such as heavy presses and other long lead time items having little or no application to civilian production.

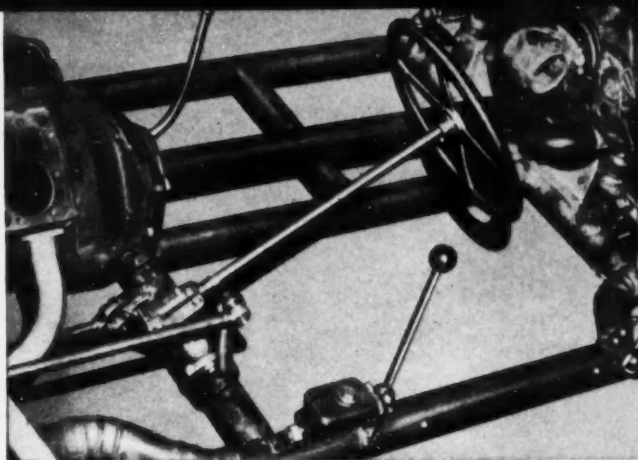
Industry has expanded in these fields as far as it can foresee requirements except for standby needs. No specific reference was made in the policy statement to the Vance plan, but it indicates that where industry is unable to carry on the Government will take over.

It is significant that the Defense Dept. budget included \$500 million to start buying machinery. This is the amount suggested by the Vance committee. Coincidentally, this is said to be the amount by which military hardware contracts have been cut.

No effort has been made to knock out this authorization from defense appropriations to date. Congress does ask, however, to be kept up-to-date on how the money is spent. Secretary Wilson has promised to spend it judiciously.

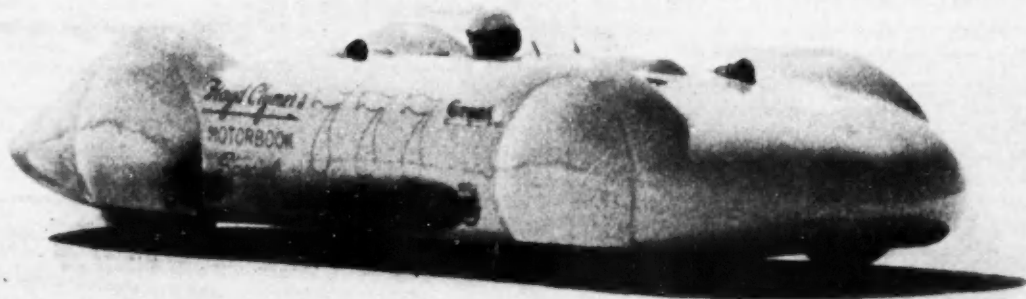
AUTOMOTIVE INDUSTRIES, August 1, 1953

# The frame of **AMERICA'S FASTEST CAR**



This view shows the rugged 2 1/2" diameter Shelby Seamless Tube frame of the twin-engine speedster.

## is made of Shelby Seamless Tubing



The Floyd Clymer Motorbook Special, driven by Willie Young, flashes across the Bonneville salt flats, setting the fabulous speed record of 252.10 m.p.h. The car was designed and constructed by Bill Kenz of Denver, Colorado, and sponsored by Motorbook Publisher, Floyd Clymer.

**252.10 m.p.h.!** The highest speed ever attained by an American automobile. That's the one-way record run of the Motorbook Special last year on Utah's Bonneville salt flats.

To reach this kind of speed and maintain it safely, a combination of power and strength—with lightness—is needed. Two 220 h.p. modified Ford engines supply the power. The frame is fabricated from Shelby Seamless Steel Tubing. Therein lies the strength—maximum strength with minimum weight that is basic in tubular steel construction. For such requirements, a tube is the strongest structural form you can buy.

Rugged, shock-absorbent Shelby Seamless Tubing combines to the highest degree the factors of strength, safety, and workability. It is uniform throughout, dimensionally accurate, easy to bend and shape. And it possesses excellent machining and superior welding qualities.

Shelby Seamless Mechanical Tubing is produced to exacting standards by the world's largest manufacturer of tubular steel products. It is available in a wide range of diameters, wall thicknesses, and steel analyses. You are welcome to call on our engineers any time. They will be glad to help you apply U.S.S. Shelby to your specifications.



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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

### U.S.S. SHELBY SEAMLESS MECHANICAL TUBING



UNITED STATES STEEL

**What every  
Automobile man  
should know about**

# Power Steering

The fastest-growing innovation in automotive history is Power Steering—and the leader in Power Steering is SAGINAW, world's largest producer of steering gears. Saginaw Power Steering is now available on all General Motors cars and three other well-known makes. Nearly 600,000 new cars have been equipped with it—more than all other types combined. So naturally, many people wonder:



## 6. HOW DOES SAGINAW POWER STEERING OPERATE?

Basically, it is simply a highly-efficient Recirculating Ball Nut Steering Gear with a built-in hydraulic assist. This consists of a pump which delivers oil at 750 pounds per square inch, a reservoir, a double-acting hydraulic cylinder, and an ingenious spool-type control valve, as shown in simplified Diagram 1.

The spool valve, part of the steering shaft, is a grooved cylinder machined to a sliding fit within the grooved valve housing. The spool revolves with the steering shaft, can slide forward or backward about .060", and still retain the high-pressure oil. Whenever less than three pounds pull on the steering wheel is needed, the valve remains in "neutral" position as shown in Diagram 1, and the circulating oil by-passes the power cylinder. No hydraulic force whatever is applied to the steering mechanism, and the car remains completely under manual control. This assures the "feel

of the road" SAFETY ZONE which distinguishes Saginaw Power Steering from ordinary types.

However, as soon as *more* than three pounds pull is needed, the resistance of the wheels causes the ball-nut and screw assembly to act as a jack. If the turn is to the *left*, this forces the whole steering shaft, including the valve spool, imperceptibly *toward* the driver as shown in Diagram 2. This changes the course of the oil, so it now flows to the front of the power cylinder and forces the piston backward. Power assistance is thus applied to the pitman arm, to help turn the wheels to the left. At the same time, oil pressure on the valve plungers tends to move the steering shaft and spool back to neutral position, which cuts off the flow of oil to the power cylinder.

When the steering wheel is turned to the *right*, the spool moves slightly *away* from the driver. The oil flows to the opposite end of the power cylinder and forces the piston to assist in turning the front wheels to the right.

The whole system also acts in reverse to resist any force, such as a blowout, which tends to twist the wheel from the driver's hands. When a road shock is transmitted through the pitman arm, the resulting movement of the valve spool admits oil to the proper side of the power cylinder to counteract the shock. Note, too, that a by-pass valve is provided which opens in case of pump failure so there is no resistance to normal manual steering.

IF YOU'D LIKE TO LEARN MORE—we'll be delighted to send you "THE FACTS ABOUT POWER STEERING".

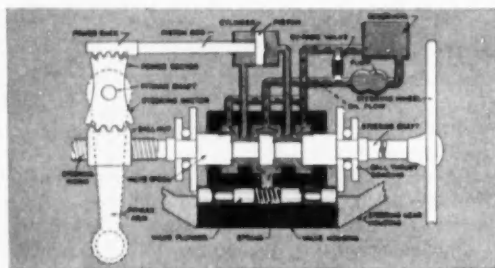


Diagram 1

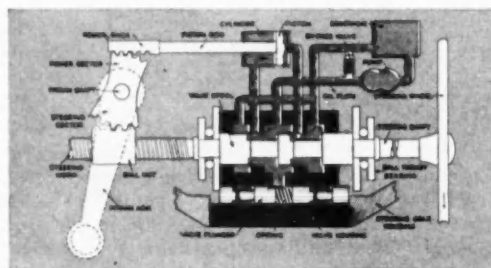


Diagram 2

# Saginaw

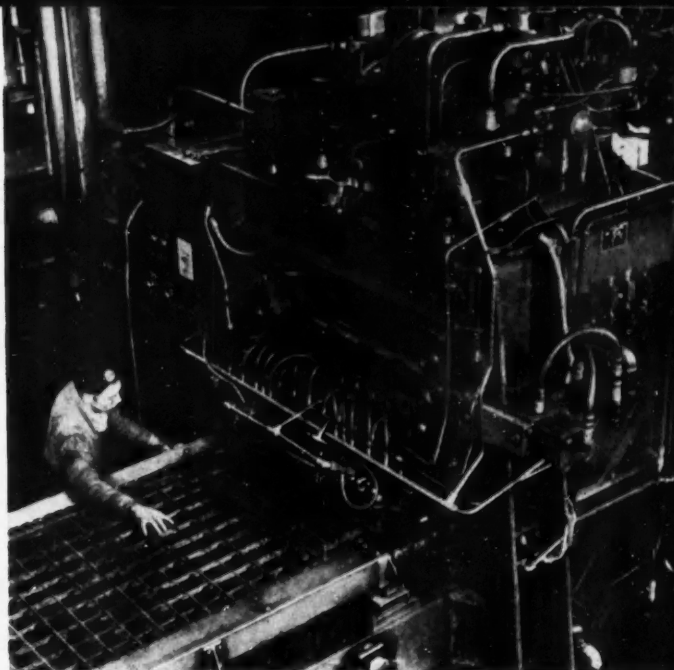
## POWER STEERING

Saginaw Steering Gear Division  
General Motors Corporation  
Saginaw, Michigan (Dept. I)

Please send a free copy of "The Facts About Power Steering"

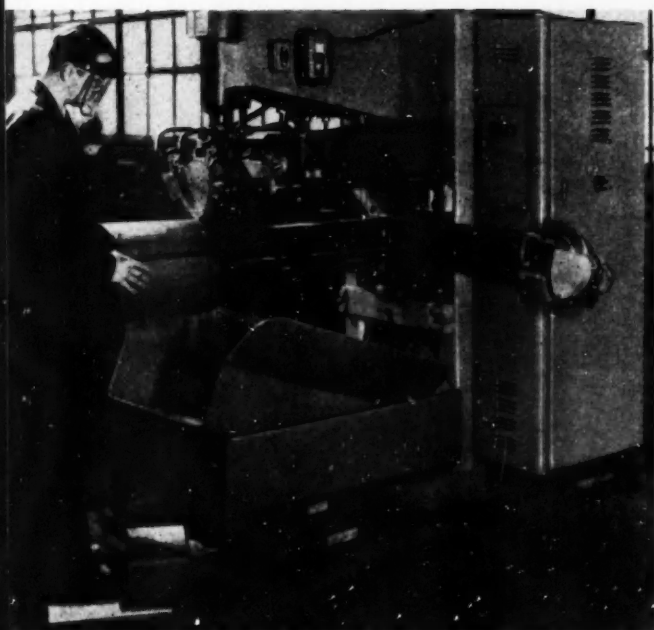
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**FOR MORE INFORMATION**, contact your nearby G-E Apparatus Sales Office or your welding machine manufacturer or his agent, or write:

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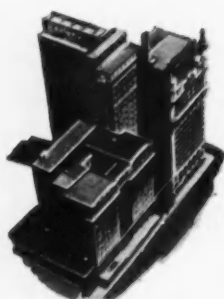
Please send Bulletin GEA-5816, "The Story of Resistance Welding," which gives the how's and why's of resistance welding and a description of G.E.'s complete line of controls.



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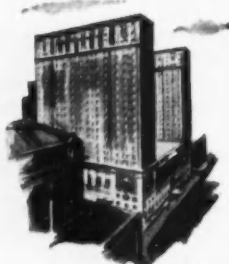
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*The Drake*



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BALTIMORE  
*Lord Baltimore*



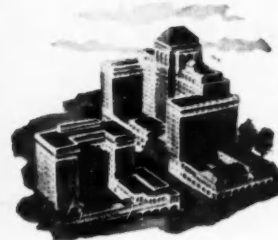
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Lockheed Aircraft Corporation recently conducted a person-to-person canvass that put a Payroll Savings Application Blank in the hands of every employee of Lockheed's eleven plants in Southern California. At the conclusion of this one-week campaign, 36,419 of the 38,037 employees—95.7%—had signed up on the Payroll Savings Plan. Three of the eleven plants achieved 100% enrollment.

Lockheed's 95.7% in the Southern California plants is the highest employee participation of any company or group of this size this year. The previous national record in the aviation industry—92%—was set by Lockheed's Georgia Division in April, 1953. Of Lockheed's total payroll—50,000 men and women—94.9% are building "... security—both individual and national" by systematic investment in U.S. Savings Bonds.

45,000 companies operate Payroll Savings Plans. In many of these companies employee participation ranges from 60% to 80%; in some, it is even higher. On the basis of Payroll

Savings Records, it is safe to estimate that 60% or more of the personnel of a company will join the Payroll Savings Plan—

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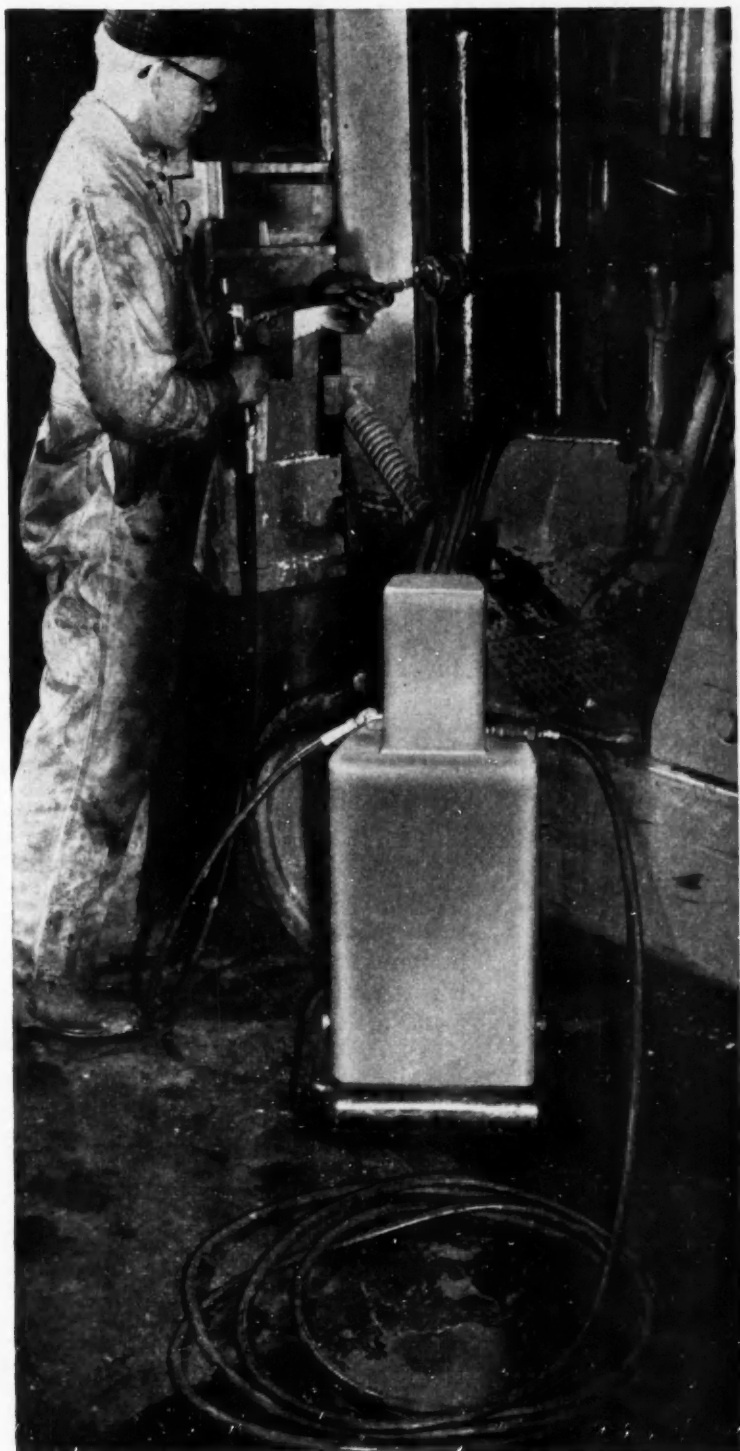
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*Photo and data courtesy of Thermoid Co., Trenton, N. J.  
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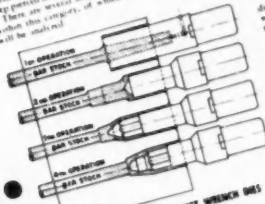
## ARTICLE 8

**MULTIPLE OPERATION FORGINGS HAVING DEEP HOLES THAT DO NOT EXTEND THROUGH THE ENTIRE FORGING**

**MULTIPLE CHARGE**  
**DO NOT EXTEND**

Examples of this type of fusing are drag links, wicket  
members, high explosive artillery shells, etc. - where the  
deep pierced hole does not extend through the entire body.

There are several methods of forming pieces that fall  
within this category, of which several typical examples  
are analyzed.



MULTIPLE OPERATION SOCKET WRENCH DUST  
SKETCH "A"

SKETCH "A"

The first one to be described is a woker written on the end of a bar and having a deep cavity. To determine the number and shape of the different operations it is necessary to first calculate the volume of the bar and then the volume of the cross-section area of the bar and of the cavity. The length of bar or stand of the bar is measured. The next step in the process is to determine the correct shape of the bar. This is done by measuring the correct shape of the bar.

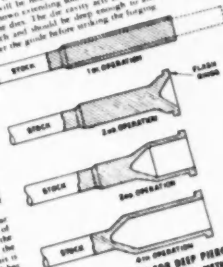
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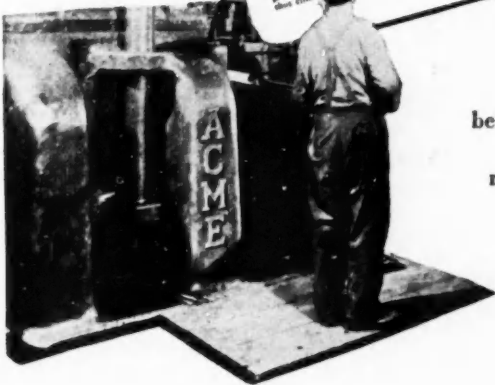
Diagram illustrating the 4th operation of progressive piercing for deep pierced forging. The diagram shows a punch moving through a workpiece, with labels for 'PUNCH', '4TH OPERATION', and 'MULTIPLE OPERATION FOR DEEP PIERCED FORGING'.

**SKETCH "B"**

A second method in the subject category is illustrated in Sketch "B" which shows the operation necessary to produce a forging having a deep hole such as a drag link or other similar piece. In this sketch it should be noted that the material is gathered in a cavity in the dies so the first operation rather than in the heading heat, thus producing the desired cross-section.

In the second operation the forging is shortened to the proper length and at the same time the frame end is

---



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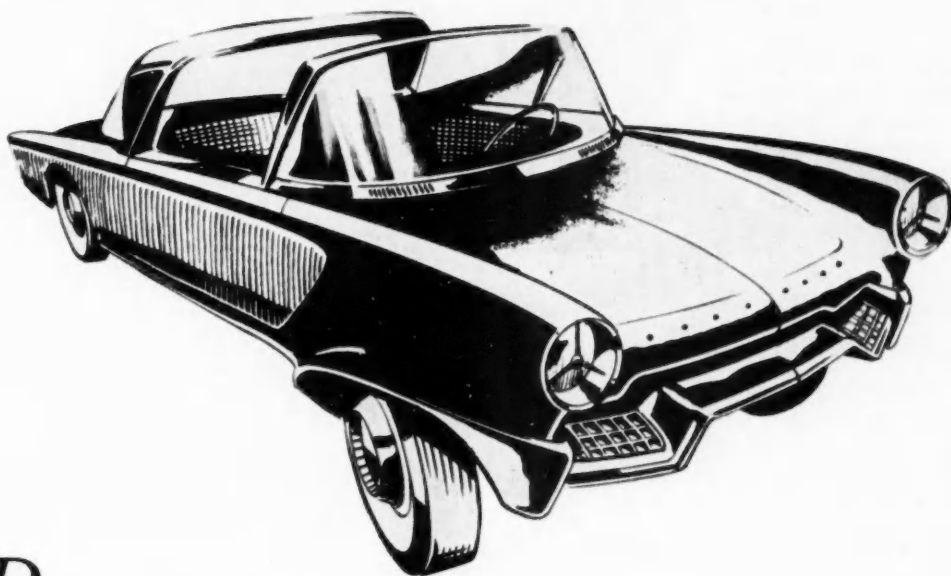
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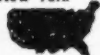


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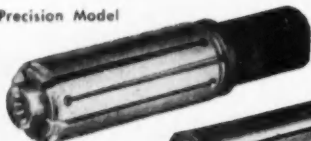
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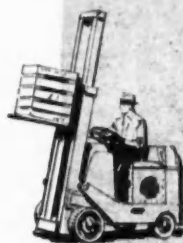
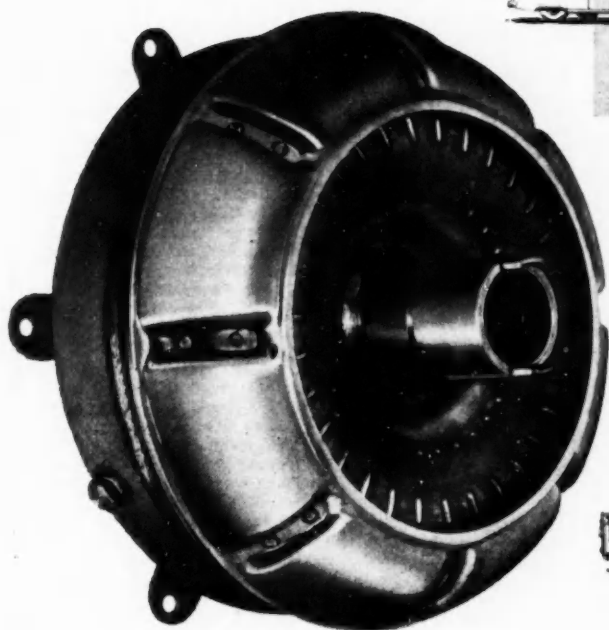
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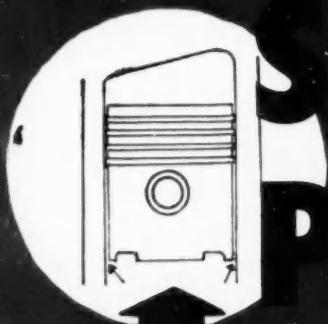


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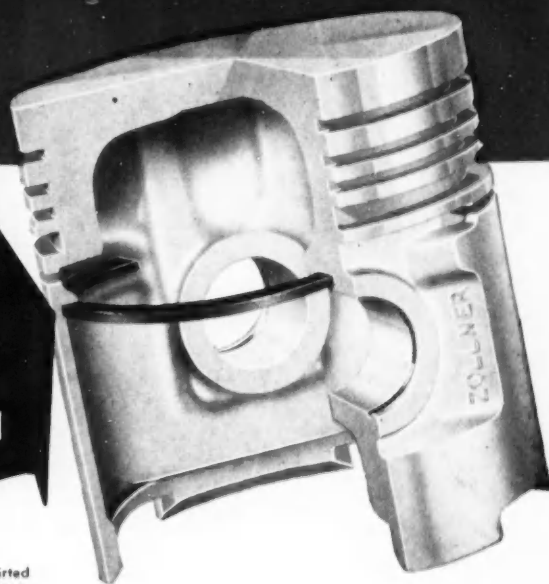
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